Every Murray LADDER

has high elevating speed

Thirty seconds from the stopping of the truck to a *secure* footing atop the Murray Crow'snest! That's speed. In Greater New York, for example, each Crow'snest in service is raised and lowered 200 times a day—once every 7 minutes and 12 seconds. The Crow'snest is the world's *fastest*, easiest-to-use ladder.

-AND

tremendous strength

Practically flawless, straight-grained Sitka spruce —chosen to meet air-craft specifications. Send for *free* book, illustrated below, which shows every detail of fine design and construction—too meaty to repeat here. See *why* the Murray Crow'snest stands UP.

-AND

uncanny flexibility

Without moving the truck, the Crow'snest is swung over parked cars, among tree limbs—anywhere. It turns a complete circle; locks securely in any position; changeable in a jiffy. No service ladder *can* do a better, safer, quicker job. None does. Metropolitan Device Corporation, Brooklyn, N. Y.

-AND

Only a Murray LADDER is a Crow'snest

Send for this FREE book

The Path to Victory

It can now be said with some assurance that the government program of appeasement with utilities, if there ever was one, no longer exists. Within the ranks of Congress, SEC, FPC and PWA there is a strong public power bloc intent on nationalizing the power industry. From this group can be expected an attack on the integrity of privately owned utilities and on their rates.

In some quarters it is believed that this is a last desperate stand of a group that knows it is licked, but is unwilling to withdraw without inflicting as much damage as possible upon private industry. Those who hold this opinion point to the growing public dissatisfaction with the Administration's utility harassment activities, as is evidenced both in the daily press and in the growing volume of letters from the public to government agencies and public officials in Washington.

There seems to be some justification for believing that the anti-utility propaganda from the national capital will prove to be more annoying than harmful, but any one who underestimates the effects of such propaganda will be making a mistake. The battle is not yet won, not by a long sight.

Full appreciation of the situation, however, will mean much to the industry, for then no false hopes will be aroused and progress can be made in the only direction that will lead to success. Any thought that help can come from this, that or some other person in Washington can be abandoned. There is just one place to work, and that is back home with employees, customers and security holders. Those people vote, and they alone have the power to nullify the efforts of the public power bloc.

In a sense this is good news, for it should keep the industry from chasing will-o'-the-wisps, from building up false hopes, from placing trust in some one else to lead the utilities out of their difficulties. It should be encouraging to know that the public not only is discounting the vicious attacks from Washington, but is fed up with New Deal efforts to destroy private initiative.

There is some tendency to mark time for another eighteen months in the belief that the 1940 election will repudiate the New Deal. To do so would be a mistake. This is not the time to sit tight, it is the time to get busy. Public opinion can again be lost if people think that business is deliberately delaying things.

The path is now clear. The industry has but one way open, and that is full steam ahead. To stand still is to go backward. We must put all of our cards on the table for the public and employees to see. We must sell stronger than ever the necessity for the continuation of private operation. We must stay clear of political alliances and entanglements. We must keep our record clear. If there is any place where we are vulnerable, we must make the necessary correction. We must spend to correct any weak spots in our systems. And above all, we must have faith, we must have courage, we must have vision—and we must transmit this faith, courage and vision to our employees, our customers, our security holders.

Copper Catalysis Accelerates Turbine Oil Oxidation

Specifications and test method in general use do not include recognition of catalytic action of copper in lubrication systems — Suggests addition to oil testing machine to cover this effect

HAROLD FARMER, *Chief Chemist, Philadelphia Electric Company*

DURING the early part of 1935 the writer observed that several turbine oils which had satisfactorily met all the specification requirements and also showed very good stability by the prescribed Funk test[1] were not performing quite so satisfactorily in the steam turbines. That is to say, the oxidation rate as measured by the neutralization number (acidity) showed a marked increase in the rate of oxidation when compared to past performance.

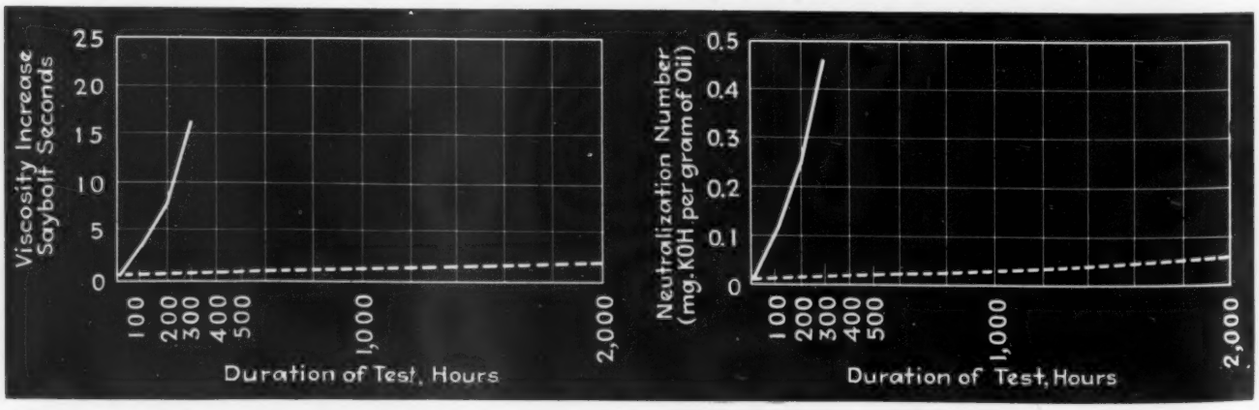
Preliminary investigation as to the possible explanation for the poor performance of the oils showed, first, that many turbine oil crudes were now being treated by the "solvent refining" process; second, that most oils subjected to this treatment possessed extremely high resistance to oxidation when measured by the Sligh oxidation test. The steam emulsion values were also satisfactory. Third, when these same oils were subjected to the Funk oil test they also showed satisfactory performance. The fact that the oils were meeting the specification requirements as well as being apparently satisfactory by other laboratory yardsticks, such as the Funk oil test, presented a problem, because the rapid oxidation of the oil in the turbine with the accompanying sludge and emulsion was developing at a rate which might result in poor lubrication and possible outage or loss of the turbine.

Reviewing the work of the N.E.L.A. lubrication sub-committee, it was evident that the development of the Funk machine incorporated what was believed to be the essential conditions found in the steam turbine lubrication system. The iron tank and pipes of the Funk machine corresponded to the turbine oil reservoir and piping; heat, air, water and forced circulation were the other factors incorporated in the test. Duing the N.E.L.A. investigation the Funk machine performance was well supported by operating performance; it appeared, there-

[1] During the year 1924 an exhaustive study of turbine oil by the National Electric Light Association brought to light many important factors in connection with stability and performance of turbine oils. This study was reported by the lubrication subcommittee in Publication No. 24-77, prime movers committee, N.E.L.A., 1924. The Funk oil testing machine which was developed during this investigation, after extensive correlation with field data of turbine oil performance, made possible laboratory tests which had a direct bearing on the probable performance and life to be expected from new turbine oils. Further laboratory studies at that time developed the fact that turbine oils having a high resistance to oxidation and a high resistance to emulsification were directly related to the Funk oil test values. The outcome of these studies resulted in the development of turbine oil specifications which incorporated definite limits for Sligh oxidation value and steam emulsion value. These specification requirements were directly responsible for the development of improved turbine oils.

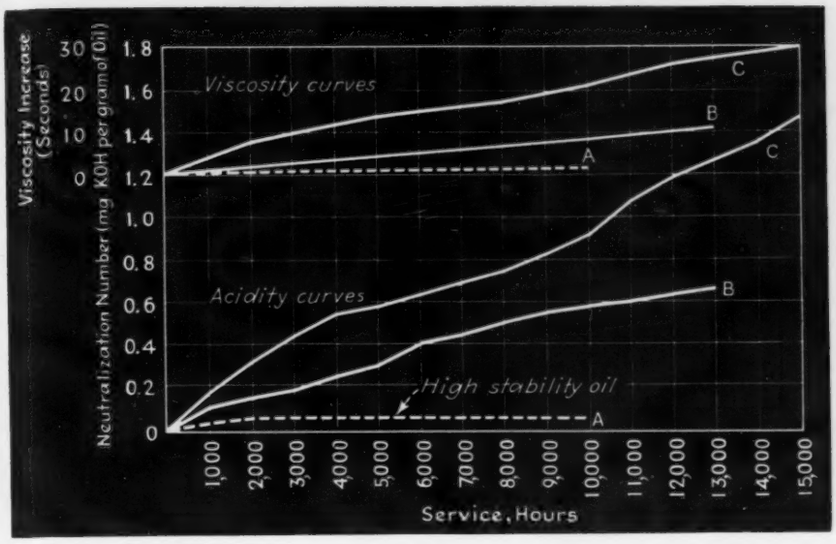
Test Comparison of Effects of Catalysis

	Hours	Blank	Iron	Brass	Iron & Brass
Well-Known Brand of Turbine Oil					
Neutralization number, mg. KOH	100	0.02	0.06	0.11	0.14
	200	0.05	0.09	0.25	0.25
	300	0.05	0.11	0.47	0.50
Viscosity increase, seconds	100	0	0	3	3
	200	2	3	8	8
	300	2	4	16	16
Color ASTM	100	2	3	4	4
Union	200	2	3	7	7
	300	3	4	8	8
Precipitation number mg. per 10-grams	100	0	0	0	0
	200	0	0	trace	trace
	300	0	0	8.0	8.5
High Stability Turbine Oil					
Neutralization number, mg. KOH	1,000	0.03	0.03	0.03	0.03
	2,000	0.03	0.06	0.06	0.06
Viscosity increase, seconds	1,000	1	1	1	1
	2,000	2	2	2	2
Color ASTM	1,000	1	1½	2	2
Union	2,000	1½	2	2	2
Precipitation number, mg. per 10-grams	1,000	0	0	0	0
	2,000	0	0	0	0

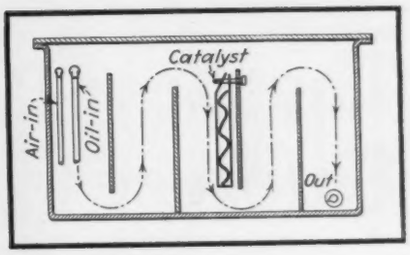


Comparative performances in presence of brass

These graphs of test data show the effect of copper catalysis in the comparative increases in viscosity and in neutralization number, indicating oxidation rate, of a well-known brand of turbine oil (solid lines) and an oil discovered to have high stability (dotted lines).



Performances in service
Records of oils "A" and "C" were obtained from same turbine



Addition of brass catalyst to Funk machine
The catalyst, consisting of 110 sq.in. of admiralty metal, is placed in the third pass of the oil test machine

fore, that the above test conditions were adequate at that time. It was, however, quite evident from the service performance of the oil that some condition existed in the turbine which was not incorporated in the Funk test or that some marked change had been made in the method of refining the oils, or a combination of both.

It is quite possible that changes in the methods of refining and treatment of the oil do remove or change some characteristic of the oil. It is also evident that the steam turbine oil system incorporates two things which are not present in the Funk machine, namely, a brass water-cooled tube bundle and the white metals used in the bearings.

Preliminary laboratory tests were started for the purpose of investigating the reaction of the turbine oils in the presence of the above metals. It was soon apparent that oxidation of the turbine oil was greatly accelerated by heat and air in the presence of brass. The white metals under the same conditions did not materially affect the rate of oxidation.

It has been known for many years that copper acts as a catalyst in accelerating oxidation in petroleum products,[2] yet this fact appears to have been overlooked in connection with steam turbine lubrication systems, because nearly every large turbine is equipped with a brass cooling system (in most installations, admiralty metal containing 70 per cent copper is employed).

With a view to studying the effect of brass and iron catalysts on different oils a test was developed in the laboratory for this purpose. Briefly, the test consists of subjecting 400 ml. of the oil to a temperature of 212 deg. F. in a pyrex glass tube, in which is immersed a piece of admiralty metal, and clean air bubbled through the oil at the rate of ten liters per hour. Three additional tubes are also set up as follows: One containing a specimen of iron, one containing specimens of brass and iron (combined) and one blank tube (oil, no metals).

Samples of oil are taken from each tube every 100 hours and tested for the following properties: Neutralization number (acidity), viscosity, color and precipitation number. The samples used for viscosity and color tests are returned to their respective tubes, the actual amount of oil lost by the other two tests is approximately 20 ml.

It is surprising to note how many of the well-known brands of turbine oils are easily oxidized when subjected to this test in the presence of brass. A survey of a large field of turbine oils revealed only one oil which was not affected by this catalyst. It was not known at the time of this investigation whether the remarkable stability of this oil was due to type of crude, to refining or to inhibition. An accompanying graph and table show comparative test data for this oil and a representative sample of oil which is readily oxidized in the presence of brass.

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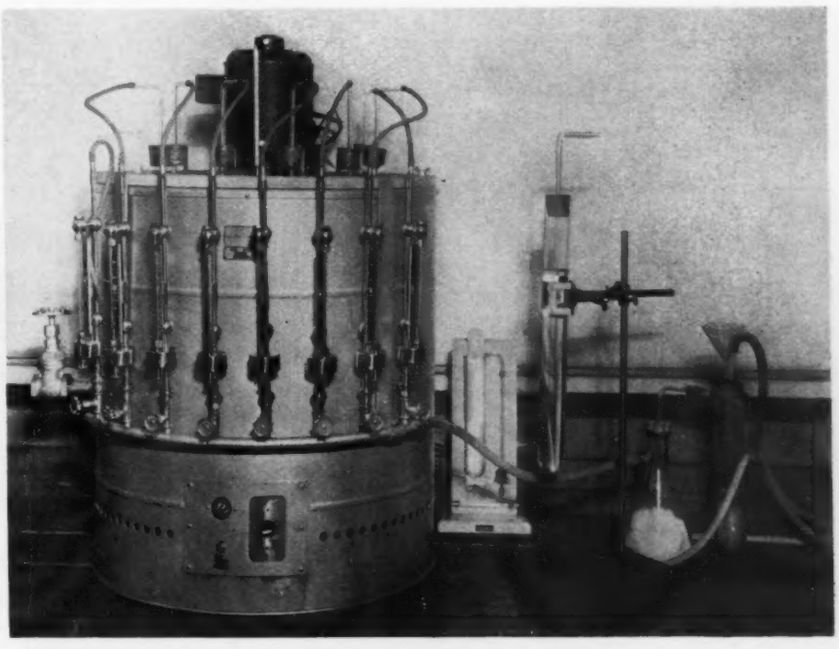


Apparatus for oxidation test

[2] "The Catalytic Oxidation of Petroleum Oils," by C. E. Waters (Bureau of Mines) *Journal of Industrial and Engineering Chemistry*, Vol. 13, No. 10, Oct., 1921. "Evaluation of Turbine Oils," by T. H. Rogers and C. E. Miller, *Journal of Industrial and Engineering Chemistry*, Vol. 19, No. 2, Feb., 1927. "Determination of the Aging Tendency of Transformer and Steam Turbine Oils," by Dr. A. Baader. Address delivered before the 41st meeting of the Vereins Deutscher Chemiker in Dresden, June 1, 1928.

The Low-Down on Fluorescent Lighting

Wise and careful application of this new light source, keeping in mind that its commercial use is in only the early stages of development, is needed for full realization of its potentialities

O. P. CLEAVER, *Westinghouse Lamp Division, Bloomfield, N. J.*

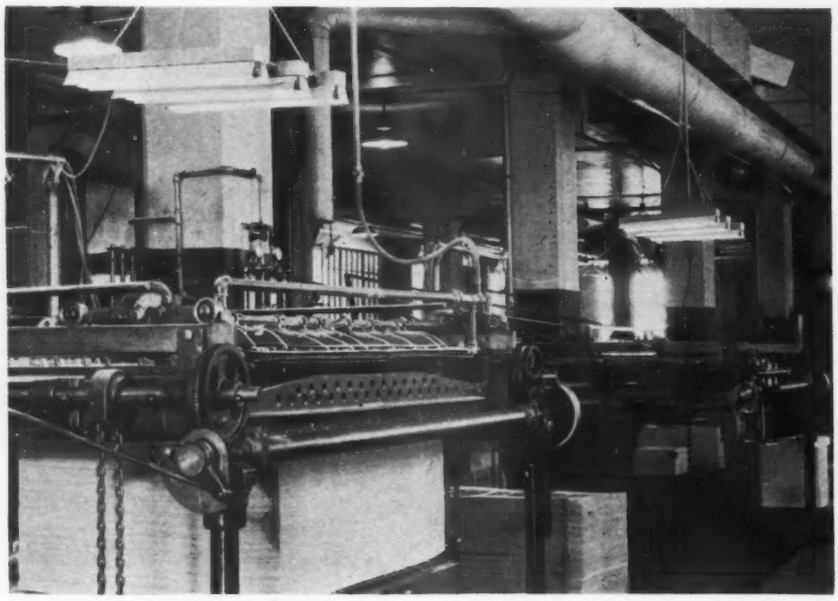


Fig. 1—Supplementing high level lighting

High levels of "cool" light that compare favorably in color with natural daylight from the windows were readily obtained in this large printing plant with these 24-in. daylight fluorescent lamps over each machine supplementing the general illumination.

Fig. 2—Atmosphere and decoration

"Daylight" 36-in. fluorescent lamps in the cove permits colors of the gowns displayed to be shown without distortion. In addition the mirrors and glass blocks are illuminated by four 24-in. daylight lamps on each vertical side.

THE public imagination has been caught by fluorescent lighting, both because of its novelty, its color, its coolness and what seems like an opportunity to cut the light bill because of its efficiency. Because of lack of understanding there has been permitted to build up considerable confused thinking about the application and economy of fluorescent lighting.

What are the facts? Is it merely an interesting novelty for exhibition to excite interest and speculation, but unsuited for practical Main Street application? What are its logical fields of application?

In one respect, illuminating engineers seem to be in agreement: The new fluorescent Mazda lamp promises much to the electrical industry in the matter of renewed public interest in decorative lighting and "day-lighting." Every effort, therefore, to foster this interest will be more than worth while, provided these new lamps are applied always with due regard for economy as well as for their intriguing and distinctive characteristics. In other words, they must be considered as *new* light sources, highly efficient, beautifully colored, yet of low wattage per lamp and hence of low total lumen output per foot of lamp.

Even though generalizations are always open to criticism and disconcerting exceptions, it may be said with some degree of certainty that illuminating engineers are in fair agreement that these new lamps find the greatest usefulness in those installations:

Where high levels of "daylight" illuminations are desired for seeing tasks, for selling, or for other reasons (Fig. 1).

Where colored or tinted lighting is necessary for effect or for decoration.

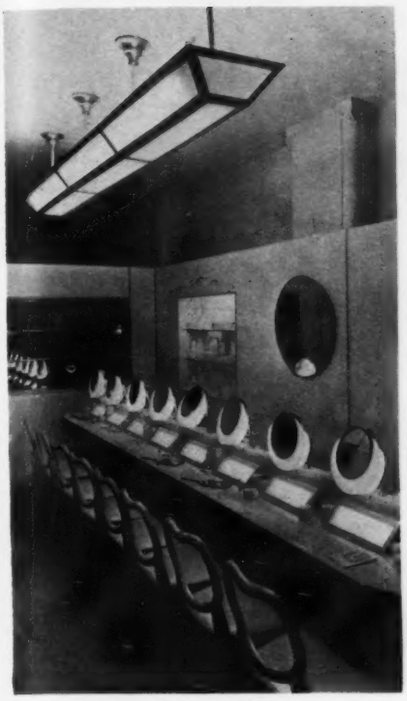


Fig. 3—Color discrimination

Make-up looks "natural" indoors and on the street when selected at this cosmetic counter. General illumination from nine 30-in. "Daylight" fluorescent lamps in the ceiling fixture and four 20-in. in the display cases. Special triangular opal glass inclosed boxes below the mirrors, containing one 18-in. daylight fluorescent lamp for high level supplementary lighting on the face. An incandescent lamp is concealed back of each mirror in a special reflector and may be switched on to indicate what the effect will be at night.

Where "cool" foot-candles are required for high level illumination in show cases, wall cases, etc., displaying perishable foods.

Where tubular light sources are necessary because of space limitations (Fig. 2).

To be more specific, an examination of the trend in present-day installations of fluorescent Mazda lamps indicates that their unique characteristics are finding greatest favor in the usual lighting fields as follows:

Home—In bathrooms for shaving; in kitchens for under cabinet illumination; for special lighting in troughs over doors or windows, on top of tall cabinets, etc., to supplement other lighting in the living room, and in laundries where low ceilings and the desirability of "daylight" color favor this new lamp.

Store — Special supplementary lighting on counters for color discrimination; in fitting rooms and at fitting mirrors in the "daylight" colors; in wall cases displaying colorful cloths (Fig. 2), dishes, silver, and glassware (again, "daylight" is favored); in show cases for the same purpose as wall cases, and especially in candy and food cases, where spoilage from overheating may result; as special lighting for fur examination; for decoration on display backgrounds and similar uses; for directional signs. (Note—Fluorescent lamps have not found favor for general illumination except in some of the smaller specialty shops or where cove lighting is installed. Greater cost and the difficulties involved in the design of fixtures of sufficient lumen output, and yet pleasing size, undoubtedly account for this fact.)

Factory—For supplementary high level "daylight" illumination where color discrimination and "cool" foot-candles are big factors to recommend its installation.

Offices—For desk illumination, where the "daylight" color and "coolness" are a great advantage.

This list of useful applications is bound to increase as the lamp is better known and fixtures are developed for their more efficient use.

At present fluorescent lighting is unquestionably in the embryonic stage, yet its many desirable characteristics should encourage a thorough study of its particular fields of application for greatest public and industry benefit. Its high efficiency, as compared to incandescent sources, may lead the uninformed to conclude that its use naturally would serve to reduce revenues from lighting, but the great and immediate necessity for higher illumination in every lighting field would indicate that this new lamp offers the lighting industry the most logical means of supplying this need to an extent never before possible—100 or more foot-candles of "daylight" color and without uncomfortable heating at the point of utilization of the light.

Is Fluorescent Lighting Economical?

Of course, the realization of these high illumination values is directly dependent upon wiring adequacy, which, in most instances, is uncommon, even in new buildings. It has been suggested that the high efficiency of these lamps would be one means of solving present-day wiring problems, since more light for the same wattage could be obtained. Such will be the case only if the power factor of the lamp and its auxiliary are properly corrected, for at present their over-all power factor is approximately 60 per cent. This again adds to the initial cost of the fluorescent lighting and immediately brings up the question of comparative costs of fluorescent and incandescent illumination.

Is "daylight" color essential? Must the lighting be tinted to satisfy the decorator? Is personal comfort important in high level illumina-

[*Continued on page 106*]

Fig. 4—High level for small store

The "streamlined" shape and low brightness of the 24-in. T-12 fluorescent Mazda lamp made possible the high level illumination in this small drugstore. "Daylight" fluorescent Mazda lamps were used as shown on the ceiling, and also to outline the wall cases for additional lighting there. The average illumination was increased from 5 to 40 ft.-candles and the total wattage was doubled. A 10 per cent increase in business has resulted since the installation was completed four months ago.

Normal Voltage Short Circuiting Removes Conductor Glaze

"Sleet" formation on long 132-kv. lines in an interconnected power system melted off quickly without resort to other than regular generator and transformer facilities—Avoids necessity for special provisions for reduced potential

PHILIP SPORN, *Vice-President and Chief Engineer American Gas & Electric Service Corporation*

OF ALL the hazards in the path of continuous transmission line performance, glaze or "sleet," with its concomitant problems, undoubtedly is the greatest that as yet remains unsolved. Thus, for example, lightning, which at one time constituted the major difficulty in the rendering of continuous and economical transmission service, has been guarded against to the point where in some cases the difficulty experienced at the present time as a result of it is only 10 per cent of what formerly had to be contended with. Further, the work now going on definitely offers further reduction in that direction. But in the case of glaze there has been no such continuous and effective progress.

It is true that compared with lightning, which is invariably a recurring annual phenomenon, glaze may in many cases not present any difficulties in a particular territory for a period as long as five or six years, and in some cases possibly over a time duration twice that length. On the other hand, the effects of glaze, when a major sleet storm does take place, are so severe that its influence on service is not felt merely momentarily, as in the case of lightning, but frequently for periods as long as days and weeks and sometimes even months.

Tempted to Do Nothing

Under these circumstances the natural temptation to do nothing that always exists in the case of phenomena of nature of rather infrequent occurrence is not one that can be adopted if one looks forward toward that satisfaction that comes only with the knowledge that, in a utility as important as electric service, everything reasonable has been done that could possibly be done to assure service reliability. In line with that idea a number of power companies have done a considerable amount of work on the problem of melting glaze after its formation and even some work on sleet prevention. But this work has neither been general nor particularly effective owing to the difficulty of the problem, and particularly to the expense heretofore generally involved in carrying through ice melting.

Not a New Idea

The idea of melting glaze is, of course, not new. The basic theoretical work was carried out, and has been appreciated, for a long time. The theory involved in placing a sufficient amount of heat into an ice-covered conductor to bring about break-up is well understood. It is possible, therefore, to calculate quite correctly the time required to bring about break-up, and the time required, within a range of limiting currents, to prevent glaze for any combination of ice thickness, ambient temperature and wind velocity. But the main weakness in all of this, as has been pointed out above, has been the economic difficulty introduced by the fact that ice melting as generally carried out on commercial transmission systems has been accomplished by isolating a section of line in trouble and connecting a segregated generator either directly to the line or in some cases through specially tap-provided transformers. This has meant that, in order to do the job effectively from a station where widely varying lengths of transmission line were involved, special transformers of considerable size with wide range of taps and connections had to be employed. While this has not prevented glaze melting in some cases, nevertheless it has restricted the practice to comparatively few locations. These have, naturally, been in areas where glaze was almost a continuous year-to-year occurrence.

The glaze problem is one that has occurred with quite recurring frequency on the American Gas & Electric Company transmission system, and particularly so on the transmission lines of the so-called Central System, extending from northwestern Indiana and southwestern Michigan to northeastern Tennessee and to southern Virginia. On this system several well-defined sleet belts exist, particularly in the extreme northern and extreme southern portions. Glaze formation in these sections on several occasions in the past has resulted in line burning, and while this has never brought about entire demoralization of service, nevertheless it did result in great inconvenience. In addition, it must be remembered that where an area is served, as is bound to occur in some cases, by a single transmission line, even though it is double circuited, and where a load of from 40,000 to 50,000 kw. is involved, the loss of a line like that for a period of even several hours, and even with a frequency no greater than once every five years, still constitutes a break in service that cannot be looked at with equanimity. Hence, in order to meet the threat of glaze, steps were taken from time to time many years ago to attempt to prevent ice formation by shifting of load to lines threatened.

This, however, both because of the limited amount of load that can generally be so transferred, and because of the delay in starting the shift, owing to the impossibility of gauging

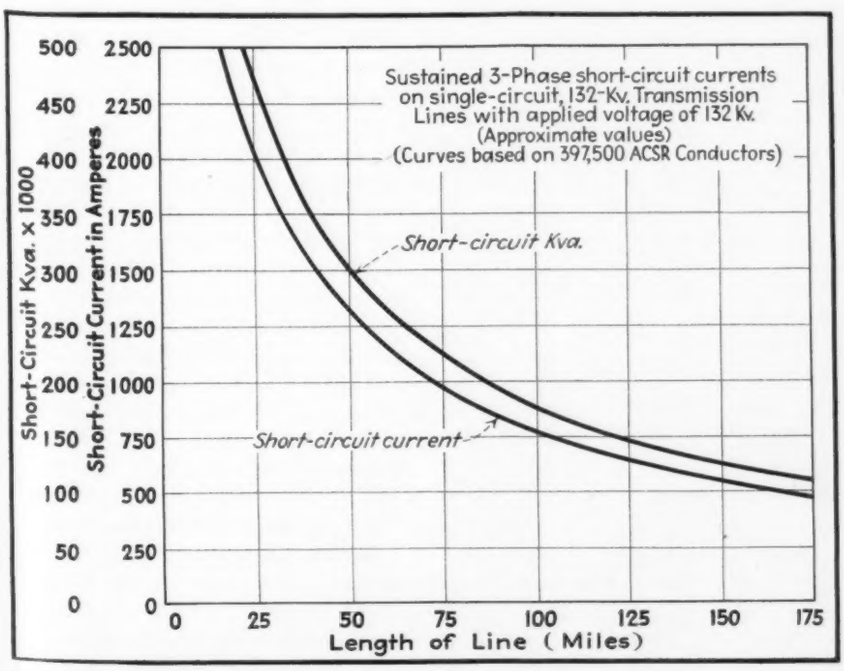
from a group of widely separated switching or operating stations the true condition as regards glaze between the lines, did not prove very effective. As a later development, steps were taken, therefore, to work out connections on one section of the 132,000-volt transmission system between the 132,000-volt bus and a 27,000-volt bus existing at that point, so that in case of glaze a 132,000-volt circuit could be connected to the 27,000-volt bus for sleet melting. But this proved satisfactory only in the case of two lines, each having a length of the order of 30 miles.

Full Line Voltage

A thorough consideration and analysis of the problem disclosed, however, that on an integrated and interconnected system of the type described above, where ample resources in the way of both power and reactive supplies were available, and where almost no important load was being handled by anything but a double-circuit transmission line, the natural and most effective method for handling glaze melting was the utilization of the main transmission voltage as the voltage of supply for sleet-melting current.

In order to get a proper value of current, resort has to be had to switching between supply and grounding points so as to interconnect enough transmission sections to give a short-circuit current at the operating voltage within a range that would bring about melting within a period of about one-half to one hour. This can be seen by an examination of the accompanying chart. Here has been plotted for a 397,500-circ.mil, A.C.S.R. conductor, 132,000-volt transmission line, short-circuit current in amperes and short-circuit kva. against distance in miles. It will be noted that the curve gives no apparent consideration to terminal or generator reactance, but this is always the case where length of line of 100 miles or more is involved on an interconnected system. On examining the curve it will be noted that the short-circuiting of 133 miles will produce a short-circuit current of about 625 amp. and a short-circuit kva. of about 140,000 kva. This, as a matter of fact, is one of the practical line distances and represents the length of line between the South Bend substation of the Indiana & Michigan Electric Company and the Lima switching station of the Ohio Power Company.

During the past year studies of this sort were brought to a head over the entire transmission system on the American Gas & Electric Company properties and the values of short-circuit current and kva. necessary to bring about effective and rapid melting determined. This covered the working out of all the switching arrangements necessary to bring about setups that made possible on the 132,000-volt system, for example the obtaining of currents during short circuit ranging from a minimum of 440 amp. to a maximum of some 645 amp., all at 132,000 volts. Translated into kva., this means a range from a minimum of 101,000 to a maximum of 148,000 kva.



Current and kva. for sleet melting at line voltage vs. line length

When melting glaze at system voltage (132 Kv.) line lengths from 100 to 175 miles are normally used in order to limit the sustained short-circuit current to values ranging from 500 to 750 amp.

The Record

During three glaze storms which have occurred within the last six months extensive melting operations were carried out in accordance with this program and section by section of the transmission system set up and short circuited at 132,000 volts until sleet was entirely cleared off. As a typical example of line grouping, the case of the Twin Branch-Lima line was mentioned above. With $\frac{3}{4}$ in. of ice on the conductors between Fort Wayne and Lima, and a wind of 18 miles per hour, which was actually causing the conductors to dance, it was decided to try out this method of clearing. One circuit between South Bend and Lima was opened and grounded at Lima and the normal buses bypassed at Fort Wayne and Twin Branch and then connected to the system through the reserve bus oil circuit breaker at the South Bend substation. This actually gave a short-circuit current of about 630 amp. involving some 145,000 kva. and an I^2R input of some 40,000 kw. After about forty minutes of operation under this setup the line was completely cleared of all ice.

As another example, during a period of sleet formation on the line between Fort Wayne and Muncie, the melting circuit set up was one involving 148.4 miles running from South Bend to Twin Branch, from Twin Branch to Fort Wayne and from Fort Wayne to Muncie. The ice loading under this condition consisted of $\frac{1}{2}$-in. ice for 10 miles north from Marion, with comparatively little ice between Marion and Muncie, and about $\frac{1}{16}$-in. ice from Fort Wayne south. Short-circuiting of this line at system voltage gave a current of 580 amp., a lagging kva. of 135,000, with an I^2R input of 35,000 kw. After staying on short circuit for a period of 29 minutes, the line was cleared

[*Continued on page 105*]

Range and Water Heater Sales Stimulator

How five utility companies exceeded quotas of the Modern Kitchen Bureau

• *Despite unsettled business conditions prevailing during the recent "Discovery Month" activity of the Modern Kitchen Bureau, a few utilities achieved notable sales success with ranges and water heaters in this campaign. Their stories of how these jobs were accomplished follow:*

Kansas Gas Mobilizes All Selling Aids

By O. J. FAUCHER
Sales Promotion and Advertising Manager
Kansas Gas & Electric Company, Wichita

At the start of our campaign sales meetings were held for all Kansas Gas & Electric salesmen. The residential sales manager and a representative from the Hotpoint Company introduced them to the "False Face" campaign and presented newspaper and radio advertising as well as other promotional aids designed to help them sell more ranges and water heaters. During these meetings rivalries between divisions and individuals were born and wagers made, a valuable stimulant to sales efforts.

For two months after the campaign opened all sales and advertising activity promoted the electric range and water heater. Radio spot announcements and programs, newspaper space and window displays were devoted to these products. And every week a bulletin went to all salesmen to keep interest alive and keep them informed on the progress of the campaign, as well as the progress of each division and individual.

Running concurrently with the range and water heater campaign, the "President's Campaign" encouraged non-sales employees to turn in prospects for all kinds of electrical appliances. Of the numerous range prospects so received, a good percentage were sold. The co-operation of the non-sales employees was a valuable help in making the campaign quota.

Although it was necessary to prepare the campaign and advertising before we had received the Modern Kitchen Bureau material, the bureau's advertising and promotional activity was helpful in making a receptive public which bought 276 ranges and 89 water heaters during the two months of the campaign. This was 35 units over the campaign quota.

Promotional material included the campaign booklet given to each salesman, proofs of newspaper advertising, copies of bulletins sent each week to salesmen and two pictures of window displays.

Puget Sound Stresses "Half as Much" Motif

By PATRICK JOHNSON
General Sales Manager
Puget Sound Power & Light Company,
Seattle, Wash.

We purchased 250 of the bureau's excellent Discovery Month range posters for widespread placement and display by active range retailers over our territory and for use of our 50-odd branch offices, with the result that constant repetition during the month drew attention to the important sales methods that "electric cookery costs half as much as you think."

We also secured 75 of the bureau's Discovery Month water heater posters for display use by our offices and we enlisted the interest of our sales personnel to make use of the discovery theme as far as possible in customer contacts.

The momentum of our sustained activity, coincident campaigns and dealer activity eliminated any uncertainty of making our Discovery Month quota and our impression is that the Modern Kitchen Bureau program was a stimulus that was helpful to running over the quota to a gratifying amount.

Popularity of Ranges and Water Heaters Shown by Sales Records Established During Discovery Campaign

	Ranges		Water Heaters	
	Quota	Sales	Quota	Sales
Kansas G. & E.	250	276	80	89
Puget Sound P. & L.	375	551	100	182
Public Service of N. H.	80	140	..	..
Florida P. & L.	250	505	220	207
Indiana Service Corp.	50	161	13	57

Mass Meetings for Florida Employees

By R. B. ROBERTS, Jr.
General Sales Manager
Florida Power & Light Company, Miami

"Discovery Month" was actively promoted in our territory by company salesmen, by employees and co-operating electric dealers.

We used 2,000 books on electric cooking and 2,000 books on electric water heating which were prepared by the Modern Kitchen Bureau, in addition to 230 range and 230 water heater discovery month window streamers for this promotion.

As our regular fall campaign was not scheduled to start until the middle of October, our dealers were notified of Discovery Month during the latter part of September. Each dealer was personally presented with a range and water heater window streamer and Discovery Month booklet and their use was explained to the dealers.

Due to the fact that our window displays are planned and produced weeks in advance, the Discovery Month theme was added to our regular displays by including the banners on all company display windows.

During the second week of Discovery Month mass employee meetings were held in each of our four divisions. Details of the campaign were presented by members of the general office sales department. During the meeting copies of the Christmas sales jamboree news were dis-

tributed which further explained the campaign and Discovery Month. Following the business session, dancing was enjoyed by the employees and their wives, approximately 2,000 in number, who attended the four meetings.

New Hampshire Lauds Long Term Promotion

By TAYLOR C. HARVEY
Sales Manager Public Service Company of New Hampshire, Manchester, N. H.

For any company to make 175 per cent of a range unit quota is news. But when the conditions behind this record are known, the news becomes even more amazing and startling.

Like other utility companies in New England, the Public Service Company of New Hampshire's lines were heavily damaged by the September hurricane. With the chaotic conditions left by the wind, it was weeks before service was fully restored to our customers. It could be assumed, naturally, that such an unexpected interruption in service might weaken the customer's faith in electricity as a fuel. Yet this lack of faith did not develop. In fact, much to the elation of the company, the range sales in the month of October were 175 per cent of the budget set for the month by the Modern Kitchen Bureau, and it was the third largest range sales month in the year, with the dealers selling more than 50 per cent of the total.

A great deal of the credit for this accomplishment goes to the promotional work done through the past years by the national and local agencies. Electric cookery has been sold to the New Hampshire public to such an extent that the possibilities of losing power from uncontrollable natural causes was no deterring factor in the buying customer's mind.

The theme of the company's advertising in October, "Have the exclusive advantages of electric cookery," was told to the readers of 29 newspapers in its territory. In the city of Manchester another promotion helped to sell electric cookery during "discovery month." This was an all-electric cooking school conducted for four days and sponsored by a local hospital association. This school attracted an audience of nearly 3,000 women, and again the story of the exclusive advantages of electric cookery was strongly presented.

A strong advertising campaign, electric cookery demonstrations and more intensive selling, plus an astonishing amount of public confidence and acceptance . . . these made "Discovery Month" successful in the Public Service Company of New Hampshire. Not only did the customer discover all that electric cookery had to offer, but the company discovered that electric cookery has definitely taken its rightful place in the minds of its customers as a satisfactory, economical and dependable fuel.

Sealed Meter Proves Low Cooking Costs

By ROY A. BRIDGES
Sales Promotion Supervisor
Indiana Service Corporation, Fort Wayne

We prepared in our All-Electric Health Kitchen food equivalent to what the typical American family of four eats in three days. Twenty-one different items were cooked electrically for 13½ cents, or, in other words, 6¾ kw.-hr. was consumed to cook this large amount of food.

Several preliminary meetings were held before the campaign opened with electrical appliance dealers and distributors to inform them about the Discovery Month promotion plan. A chairman was appointed from the distributors to act as a guiding hand for all the distributors and dealers. It was through these activities that all distributors agreed to run an ad over their own signature with the announcement advertisement, telling about the proposed demonstration. Most of the active electric range dealers also ran their own ads in the same issue with the announcement ad.

In order that all the dealers, distributors and the city utility company and our company might start this demonstration off with a bang, one of the local newspapers organized a dinner meeting for all interested parties and set forth the entire plan.

A full-page newspaper ad was released for publication in the early part of the month, informing the reading public that we were going to prove that electric cooking costs less than one-half what you think. We also informed the public that the results of these demonstrations would

[*Continued on page 109*]

"Discovery Month Meals" in Fort Wayne, Ind., and "Discovery Month Mass Meetings" in Miami, Fla., used for successful promotion of range and water heater sales. The three meals portray one day of Discovery Month menus

New Safety Mount Holds Transformers on Poles

New England Power works out method to prevent transformer falling when pole is struck by motor vehicle—Manufacturers cooperate in development of adapters for attachment of new type clamps to distribution transformer tanks

CARL N. THOMAS, *Assistant Engineer New England Power Service Company*

OPERATING COMPANIES of the New England Power Association have been confronted during recent years by an increasing frequency in traffic accidents which have torn transformers loose from poles. The conventional transformer hanger is a relic of the "horse and buggy" era and its general design is not adequate for the support required in these days of fast travel that find transformers frequently and violently shaken by impact between wood and automobile. Then there is the problem of embryonic chemists whose quests of Utopia, by mixing alcohol and gasoline, frequently end against a pole. Obviously, some method of attaching the transformer to the pole so that it cannot be dislodged is needed.

The first attempt at improvement was made by drilling the hangers and lagging them to the crossarm, but experience soon indicated that this method was not entirely satisfactory because of the possibility of the hanger irons themselves failing at a bend or the transformer bouncing off the hangers, due to improperly tightened bolts. In the older type of untreated crossarms there was also the possibility of arm failure due to rot.

After considerable study it seemed apparent that the only suitable solution would be one whereby the transformer would be fastened directly to the pole itself. Such reasoning led to the idea of encompassing both transformer and pole with a flexible steel cable or band which would prevent angular motion between them and thus overcome the possibility of the hangers being jarred off the arm. It was imperative that the cable have sufficient strength to support the transformer in case it was bounced off the hangers.

Inasmuch as it was deemed desirable to have the sling, or "necktie," as it was later called by the linemen, of sufficient flexibility to prevent it from accidentally springing upward and contacting primary wires during installation, a very flexible stainless steel cable $\frac{1}{8}$ in. in diameter, with a breaking strength of 1,700 lb., was chosen for the purpose. The method of installation decided upon was to carry a loop of the cable around the transformer and pole at about one-third of the height of the tank, drawing it hand tight and taking one complete turn with each end around a common lag equipped with round washer at the back of the pole. The lag was then to be screwed home and the ends of the cable fastened to the pole by $\frac{1}{4}$ x 2-in. staples.

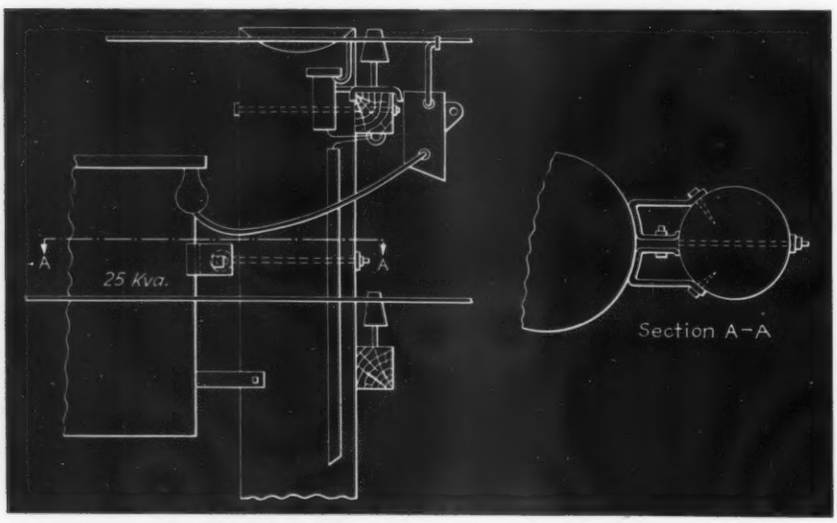
Before adopting this as a standard practice impact tests were made by the Narragansett Electric Company at Warren, R. I. These tests were conducted as follows:

Three 55-ft. creosoted pine poles were lashed to a heavy pole dinkey which was located 100 ft. from the test pole. A line attached to the dinkey was carried past the test pole, through a snatch block, then back to a line truck. The truck was started and accelerated as rapidly as possible, the line gang (running at the tips of the poles) guiding the load so that the butts of the poles hit the test pole. The total weight was approximately 8,000 lb. and the speed, as determined by stop watch and checked by moving pictures, varied in different tests from 8 to 11 miles per hour.

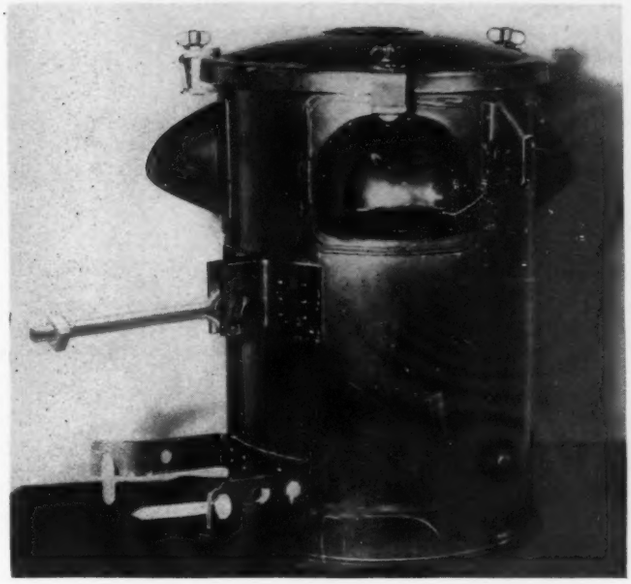
A study of the tests indicated:

When the impact occurred on the face of the pole transformers mounted in the conventional manner were in most instances dislodged.

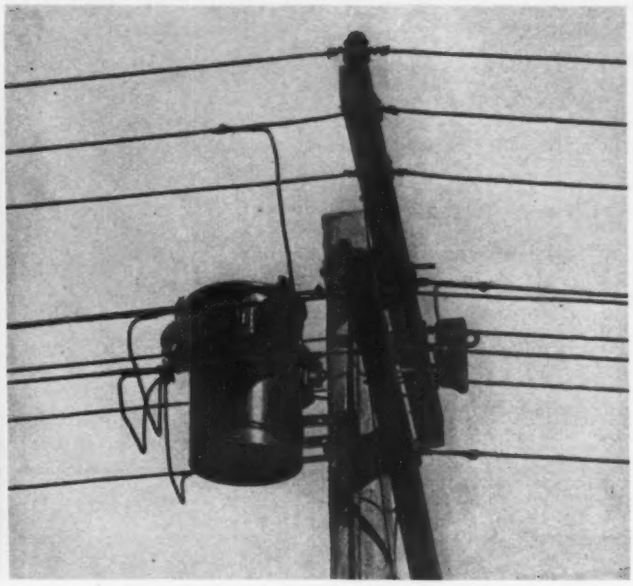
Transformers with their hanger irons lagged to the top arm and bolted to the kick arm might frequently be bounced off the hangers or, in the case of cast-iron tanks, have their bolt pockets broken.



Layout for transformer hanger
Units up to 37.5 kva. rating are now being equipped with hanger brackets spot-welded to the cases in the factory. Maximum size mounted near pole tops is 25 kva.



Close-up of transformer mounting brackets, bolts and lag screws



Transformer mounted on pole without crossarm attachment

In the latest design eye-bolt is located close to case, lugs of the brackets being carried outward and flared slightly

When transformers were mounted in the conventional manner and fastened by a single cable sling the sling would be broken and the transformer torn loose.

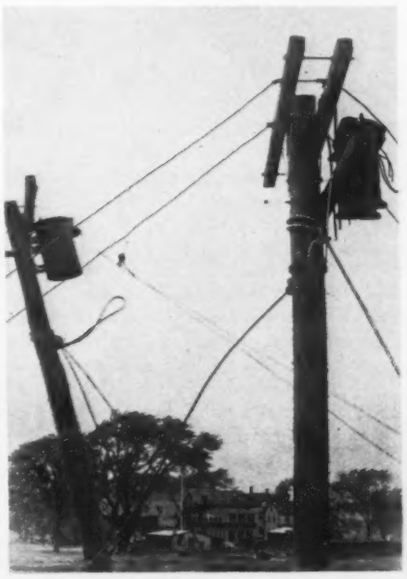
Transformers fastened with a double cable sling could not be shaken clear, although they might move upward and at the same time rotate within the sling sufficiently to allow one hanger to be disengaged from the arm.

When the impact occurred on the back of the pole transformers mounted in the conventional manner were less vulnerable to dislodgment. No assurance could be obtained, however, that transformers could not be jarred free when in this position. Transformers fastened with a single cable sling could not be torn, unloosened or shaken off.

As a result of these tests a standard practice was adopted, requiring that all existing single-phase transformer installation on state highways and other streets subject to heavy and high-speed traffic be fastened to the pole by means of a double cable sling; that new installations must be mounted on the side of the pole away from approaching traffic and, if located on a heavily traveled street, must be equipped with sling.

Inasmuch as the sling method of fastening was not applicable to three-phase banks, plus the fact that the average cost of slings installed on single transformers was $3, it was obvious that some device integral with the transformer, by which it could be attached directly to the pole, would supply the desired safety feature and save the cost of the sling. Such a piece of equipment would save the cost of a second arm with its complement of hardware, pins and insulators in instances where a double-arm structure would otherwise be used for supporting transformers.

It is true that plates for mounting the transformer directly on the pole were available, but they were still bolted to the old style slotted bracket, which left the transformer subject to dislodgment if the bolts were improperly tightened. These plates were attached to the pole by two through-bolts, which required the use of a template properly to locate the bolt holes.



Cannot be jarred loose

Transformer (5 kva.) remains firmly attached to 35-ft. pole at left after impact which shattered the pole at the ground line. "EWD" mounting was used. At right, a 7.5-kva. transformer is shown supported by crossarm hangars, with sling attached for impact test. The new pole-mounting scheme eliminates the sling and use of crossarm for hanging.

A different method of support was developed by E. W. Dillard, electrical engineer of the New England Power Association, on which application for a patent has been filed. It comprises three pieces to be welded to the tank in place of the four conventional brackets. In the upper position are two L-shaped pieces so spaced that their projecting ends form a clevis which will just span a standard §-in. eye-bolt and of such length that their flattened ends will bear on the pole before the eye of the bolt makes contact. In the lower position is a U-shaped bracket, the projecting ends of which are bent outwardly at 45 deg. to form a bearing on the pole to which they are lagged.

Last September impact tests similar to the earlier ones were made on both single- and three-transformer installations equipped with this hanger and in each instance they came through without showing the least sign of distress, although one pole was broken by the impact.

The three-transformer installation is made by putting double arms in the upper gain and a single arm in the gain below; then placing a length of a 6-in. channel vertically in each transformer position, bolting it to the

[*Continued on page 107*]

Company Sorority Builds Good Will

On their own time and at their own expense a voluntary group of women employees give the company a "good neighbor" reputation by taking active part in community betterment and welfare activities

JEANETTE I. REES, *Chairman Edison Women's Committee,*
Southern California Edison Company, Ltd., Los Angeles, Cal.

Welfare work

At Thanksgiving and Christmas Edison girls are particularly conscious of the unfortunate in our territory. During the recent holiday season many groups sent Christmas dinners to deserving families, with toys, clothing and other gifts as needed; dressed scores of dolls for little ones in homes and institutions; co-operated with local charities. Illustration shows San Bernardino girls who sent out 25,000 Christmas Seal letters for the tuberculosis association. A radio was sent by one group. Another raised money to care for a child for two months at a special convalescent home. Still another filled generous Christmas stockings for all boys and girls at the county detention home and the tubercular ward of the county hospital. One of the larger divisions dressed dolls and sold them to provide extensive benevolences—food for a destitute family; gifts for all at the county old people's home. They decorated a tree for tubercular children at the sanitarium and an outdoor tree at the health center. They sponsor a Girl Scout troop all through the year. Other groups held parties for under-privileged children. Even the office "shut-ins" were remembered. All of this was done with sympathetic understanding; in fact, most of the gifts were presented by the girls in person on Christmas Eve.

WE'VE been going for just a little more than ten years. There are about 350 of us now. We educate ourselves in the things the company is doing and which our friends and acquaintances think we ought to know. We try to remove barriers between employee groups. We aim to do everything we can to make the company a "good neighbor" in every community in which we are organized by making it a part of community life, by helping the poor, sick and aged, by trying to make people happier. We are the Edison Women's Committee, a voluntary, extra-curricular organization, self-starting and self-financing.

Organized in 1928, twelve groups have operated under one general chairman, with division chairmen elected each year. Each group is autonomous.

Previous to the annual meeting the general chairman has submitted a suggested program for the year, upon which each group may build its own divisional program according to local needs. Consumer opinion has been favorably focused upon the company as a result. This four-point program includes:

Education relative to the industry.

Development of individual initiative, personality and leadership.

Building good public and employee relations.

Interest in customer's welfare

Edison women are public relations minded. They invite speakers and artists from other clubs, industries, schools, churches, libraries, hospitals, professional and public offices to appear on their programs. In turn, they arrange cooking schools and lighting programs to which they invite people of the community. (The illustration shows Ventura group entertaining 96 business and professional women at cooking school and dinner.)

PUBLIC RELATIONS SERIES

Build employee good will

In the interest of employee relations our girls plan educational and social gatherings for all employees and their families. They remove the usual barrier between office employees and outdoor operating staff. They attempt to dramatize the heroism of the latter when faced with major flood, fire, windstorm or mountain snows. Whittier girls, central division, specialize in employee breakfast meetings.

Assisting in load building.

So that each member may be of maximum service to the consumer, and may herself understand and enjoy her work more, each group has its plan for self-education in company and industry matters. One holds an informal educational meeting each month in addition to its regular meeting. Some one thoroughly informed will discuss appliances, for instance —costs and methods of operation, uses, price, etc.; another, meter-reading; correct lighting, etc.

Another group is making a manual, "How It Is Done," in which each girl analyzes her work in detail. By reading one of these analyses, any one should be able to take over that desk and go ahead with the work. This facilitates promotions, and saves time, energy and dispositions. The members keep a record of all complaints that come to them. Then at their monthly round-table those who are qualified to do so explain the answers, sometimes by clever impromptu skits.

A third group has a question box, which is opened at its monthly meeting. If no one present is able to give a complete answer the question becomes a research problem for discussion later.

Along with this self-education, the girls are developing initiative, leadership and personality. They serve as gracious hostesses at important company functions. They preside beautifully at their own programs. Some are sought as speakers on correct lighting and other industry subjects. Others have so trained themselves in understanding of rates, regulations, costs, etc., that they have been promoted to responsible positions in public relations—calling upon customers; arranging home conferences with groups of homemakers, or with school people; handling high-bill complaints; promoting understanding and friendliness in general.

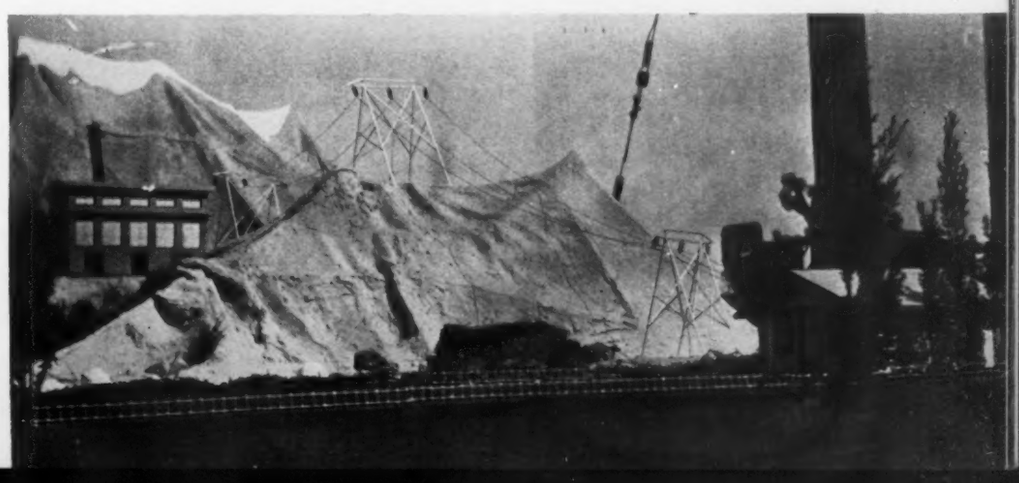
Self-education—Pomona division solves problems through constant use of its "question box"

In any study of public relations, industry must consider the growing weight of consumer opinion exerted by women customers. Domestic load is of increasingly great importance. Woman is the household purchasing agent. Her viewpoint must be considered. She insists on getting her money's worth. How is she to know of the problems of industry unless industry explains? And who understands her viewpoint so well—who can interpret business to her so well as the woman employee—thoroughly

[*Continued on page 104*]

Enter community activities

They participate in community celebrations, fiestas and sometimes prepare floats, entering them in the name of the Edison Women's Committee, as shown in the one entered by the Lancaster girls in the Alfalfa Parade. Float displays all steps of bringing power from distant mountain hydro plants to typical alfalfa ranch.



Editorials

S. B. WILLIAMS, *Editor*

Samuel Johnson Had the Words for It

WHATEVER the plans of the War Defense Power Committee might be, they are receiving no publicity other than rumors. Gossip has it, and probably on good authority, that a proposal will be made that the government finance a grid system of interconnection for the eastern industrial area, probably reaching into TVA, to the tune of half a billion dollars.

Opinion on the advisability of such a scheme differs in official Washington. In all likelihood the scheme, when and if made public, will probably be seen to differ but slightly from that proposed by Basil Manly, member of the Federal Power Commission, before the World Power Conference in the fall of 1936. It would appear that this program has been taken by the public power bloc to be used, in the name of national defense, against the utility industry.

It is hard to believe that the War Department would be a party to any scheme to embarrass the power companies or that it would permit war defense to be used as a patriotic screen behind which politicians could with immunity hurl their stink bombs. For that reason we doubt that such a plan emanates from or has the prior knowledge or acquiescence of the War Department. And if our assumption is correct, and we believe it to be, then this 500-million-dollar power grid is not to be considered as a national defense measure.

Assistant Secretary of War Johnson has publicly acknowledged that the utilities have lived up to their commitment made last fall to his committee on power for war defense to purchase 1,000,000 kw. of additional generating capacity. In the name of national defense certain units in the industry overpurchased, since in several instances this additional capacity will merely be added to an already ample reserve. In other words, the utility industry has given proof that it will do all in its power to co-operate with the government in preparedness measures that the War Department says are essential.

And even if a power grid were needed in this country, the sum of half a billion dollars is probably far in excess of what would be needed by private industry to do the essential work. There are undoubtedly several power interconnections that can be made advantageously and as emergency protection, while a number of others can be strengthened. It would do no harm for the private utilities to study this situation from the standpoint of costs and advantages. Possibly such a study might indicate steps that could be taken now and that would take the wind out of the sails of those who are masquerading as national defenders.

Power Sales Promotion

AMONG the unsung heroes of the utility business are the power salesmen. They have a greater variety of responsibilities, are responsible for a larger volume of kilowatt-hour sales, deal in larger units of sales and face more competition in the holding of business than any other part of the selling organization, yet they do not feel that they have the place in the sun that the merchandise or domestic sales forces occupy.

Dissatisfaction of this nature is a healthy sign, provided it focuses attention on the right place and leads to constructive correction. It may be that management is partly to blame for not better evaluating the power sales group, but management, after all, is human and it has ever been true that the squeaky wheel gets the grease. The real reason for lack of appreciation of the power salesman is that he has been hiding his light under a bushel.

Power sales work is largely engineering, which of itself is careful, methodical and necessarily slow. It cannot be campaigned as can domestic sales and, therefore, lacks glamour. It involves manufacturing economics and equipment that are not understood by the rest of the company and, therefore, lack sympathetic understanding and interest. It frequently involves sales that the customer does not want divulged and so lacks publicity.

Because of the ramifications of a power salesman's job, because of the thousand and one things he has to do to get and to hold business, there are some who feel that greater recognition will come provided he is more articulate about all these different phases of his work. There may be something to this approach, but offhand it would seem as though an approach that means more to the other fellow might be more popular and effective.

What power sales has lacked most has been effective promotion. With a few exceptions what promotion it has had has been devoid of personal or human appeal. It would be difficult to improve upon hard, cold demonstrable facts in a sales prospectus, but to secure attention and friendly interest we need more of the dramatic human interest approach.

Furthermore, the promotion must be where everybody, not a few prospects, can see it if there is to be widespread interest. That was one reason why it seemed

a shame not to go ahead with national publicity, as was proposed two years ago. More than one power sales director who opposed national publicity of this nature at that time has had occasion to regret his action. Advertising of this kind would do much to focus attention upon power sales, to emphasize its problems and its value to the company.

If the power salesman feels that the worth of his work and of the load he brings in is undervalued he should first recognize the difficulties of others in becoming enthusiastic about anything so lacking in humanly appealing qualities. The first step in correcting such a situation would seem to be promotion of a dramatic and human interest appeal.

Little Promise of Immediate Integration Under Utility Act

BECAUSE of the confusion within SEC, it seems highly unlikely that any progress toward physical integration of holding company properties can be made at this time. When the industry, which never liked the Section 11 or believed it constitutional, had brought itself around to trying to work out something that would be practical without resort to the courts, it then found chaos within the commission.

Not only that, but it finds the ranks of that body's employees being filled with public power advocates. It finds that the commission, instead of being an independent, unbiased regulatory body, is receiving its essential direction from the White House through the Cohen-Corcoran route. In its desire to co-operate with the commission it gave considerable confidential information, only to find that it was not always so treated. Thus the commission as presently constituted has forfeited the confidence and respect that it once merited.

There is no doubt but what the application of the Holding Company Act is one of the elements that is holding back progress in the utility industry. Companies are not going to spend money on a property that they may have to give up. Likewise, in more than one instance the close proximity of federal power projects is making transfers of properties undesirable.

Surely the commission's legal staff must know by this time that it is going to be almost impossible to apply the act as written without the consent and co-operation of the utilities. The act as a whole or its component parts, other than provision for registration and its separability from the other provisions, has never been adjudicated in the courts. When the Electric Bond & Share case was before the courts the extent to which the government went to prevent a decision on the act as a whole, or even upon the "death sentence," gave evidence of indicating that the commission's own legal staff had little confidence in the constitutionality of the act in all its provisions.

Until SEC straightens out its affairs and cleans house the most that can be hoped for in the near future is possibly some simplification of financial structures, with little or nothing in the way of property integration.

Federal Housing Projects

ELECTRICITY is man's most useful servant. It must be put within reach of all, rich and poor, farmer as well as city dweller. That has been the avowed policy of the New Deal. And it has carried out that policy in the building of large federal power projects and in the allotment to REA of huge sums of money. When it comes to housing projects, however, the Administration seems to have forgotten the benefits of electric service.

Are the electric range and refrigerator more important to the farmer than to the low-income city worker? Are not the poor of our cities entitled to the same conveniences that our government is demanding for the farmer? Apparently not, for the U.S.H.A. in the federal housing projects has not taken the same position with regard to electrical services for tenants that REA has for its farmers or that TVA has for some of the districts it serves.

But if the Administration is willing to carry water on both shoulders, that is no reason why the electrical industry should not have been as wide awake earlier as were some other industries furnishing essential services to these projects. Some progress has been made of late and we can expect to see an increasing number of all-electric federal housing installations. Under the wholesale rates, there is no reason why electrical services cannot be competitive with or even less costly to operate than others.

In working on these projects, utilities have found many difficulties, particularly with respect to policy. One problem that is most bothersome at present relates to range and refrigerator maintenance. The authority has been led to believe that these costs are very high. How much of this emanates from our friends in the gas industry can only be surmised, but the fact remains that the prevailing opinion is that electric equipment costs more to maintain than gas.

Some data on this subject are being collected, but more are needed, and quickly. It is believed by some that maintenance costs as low as 40 or 50 cents per year each for ranges and refrigerators can be secured. This estimate may be low, but in any event it is apparent that the cost is not several times this amount.

There has been an intimation on more than one occasion, when utilities have presented their lower estimates, that the power companies should handle the maintenance on the basis of such estimates. Such suggestions should be discouraged whenever broached. Maintenance of electrical equipment is just as much a part of the project operations as is that of heating and plumbing equipment. However, the utility can, and will, advise on ways to keep maintenance to a low level.

Is Thrift No Longer Worth While?

By CARTER FIELD

This noted journalist gives his personal comments and interpretations on current happenings affecting the electrical industry. His background and his location at Washington make his thoughts informative and interesting even though all may not agree with him

"SUPPOSE you had $100,000 in cash and wanted to safeguard your old age with it, what would you do?"

It is amazing how often that question, in more or less the same words, is heard in discussions in New York, Washington, in fact all over the country. It is usually followed by the statement that, of course, a few years ago, a man with such a sum to invest, who might be willing to forego all profit, and even all interest if only his principal could be kept intact, could have played absolutely safe by buying gold.

Now, of course, no one is allowed by law to buy gold for investment. Only governments can hoard gold.

But why should people be wondering what to do with money—so far as investment is concerned—at the very moment when the prime objective of the whole country is to produce more jobs, and thereby bring back prosperity?

Supreme Court Justice William O. Douglas, when he was chairman of the Securities and Exchange Commission, figured that the privately owned electric companies should have been spending one billion dollars more a year for improvements, expansions and betterments, and that this constituted a piled up spending power, which could be released if fear could be removed, amounting to three billion dollars. That estimate was made two years ago, so that the "piled up spending power" of the electric industry should now be five billion dollars.

The Terrible "If"

It should be understood, of course, that the utilities do not have this five billion dollars. It is in the banks and in investors' strong boxes, in government and other tax-exempt bonds. Douglas' point, of course, was and is that *if* fear of what the government might do to business in general and the electric industry in particular could be removed—*if* confidence could be restored, not confidence in hopes of fabulous profit, but merely of safety plus a small return on the investment—then this huge sum, five billions of dollars, would flow into productive enterprise, producing a wealth of employment and all its obvious consequent benefits.

Just last week the Census Bureau confirmed a substantial part of Justice Douglas' contention. In the five years between 1932 and 1937, the Census Bureau pointed out, the total assets of private utilities not only did not increase, but actually shrank a little! At the end of 1937 the assets of the private utilities were $16,933,633,770. Whereas at the end of 1932 the assets of these companies amounted to $17,032,539,620.

Assets of the municipally owned utilities in the same period expanded from $710,142,869 at the end of 1932 to $929,883,598 by the end of 1937.

If the estimate of a billion dollars a year lag made by then SEC Chairman Douglas two years ago was correct the assets of the privately owned utilities should have well exceeded twenty billion dollars at the end of 1937, and should have reached 22 billion dollars now *if* the utilities and would-be investors in them had not been afraid.

Afraid of what?

Of two things. First, the policy of this Administration to do everything possible, with government subsidies partially concealed and partially revealed, to encourage and foster the spread of publicly owned electric systems. Second, the spending policy of the government is running so wild, with from two to three and a half billions being added to the government debt every year, that every investor *must* take into consideration that sooner or later there is bound to be either ruinous taxation or inflation.

That is why there is so much talk of the impossibility of buying gold, in order to play safe against printing press money. And so much discussion of what could be done to avoid this danger by the shrewd individual investor, though with no satisfactory solution. In fact, buying a farm is the nearest anyone has come to it in the hearing of this writer, and even that alternative is beset with the fear of crushing local taxation.

Just now a committee of the House of Representatives is investigating some of the details of the government spending by WPA. The House members are having a regular Roman holiday over the excessive cost of many of the projects, often running to as much as twice what the same work could have been done for if regular contractors had been employed.

The Old Masters would turn over in their graves at the notion of the government *paying* young men and women to study art, and paying models to pose for them in the nude. Old-time actors sneer at the idea of considering that any one who wants to be an actor should be trained at government expense, regardless of box office flops.

Economy in Congress?

But—this doesn't mean Congress is really going to turn economical—stop the spending which is frightening the investors of the country. While this very investigation was going on the House of Representatives passed a $305,188,514 appropriation for rivers and harbors and flood control! This was not done without thought. The economy bloc members had been screaming their heads off against it. The budget estimate was nearly $50,000,000 less! It was $255,634,454. Appropriations for the current year for the same purposes were $196,962,867.

Just before the final passage of this bill by the House a motion was made to send it back to the committee with instructions to cut it $50,000,000—in short, to bring it within budget estimates. This was voted down 254 to 127.

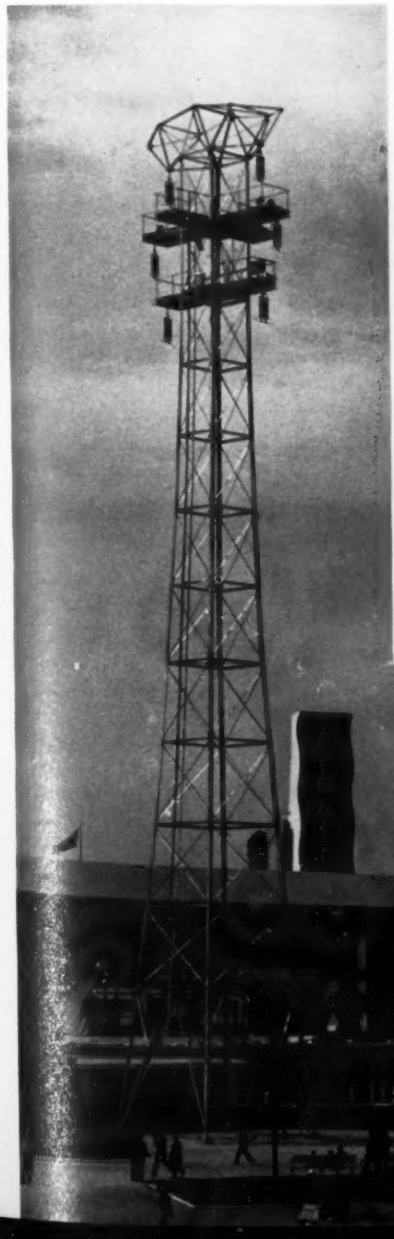
Even more interesting, to any one looking for economy, is the fact that a desperate effort was made to prevent a rollcall on that motion to cut

[*Continued on page 103*]

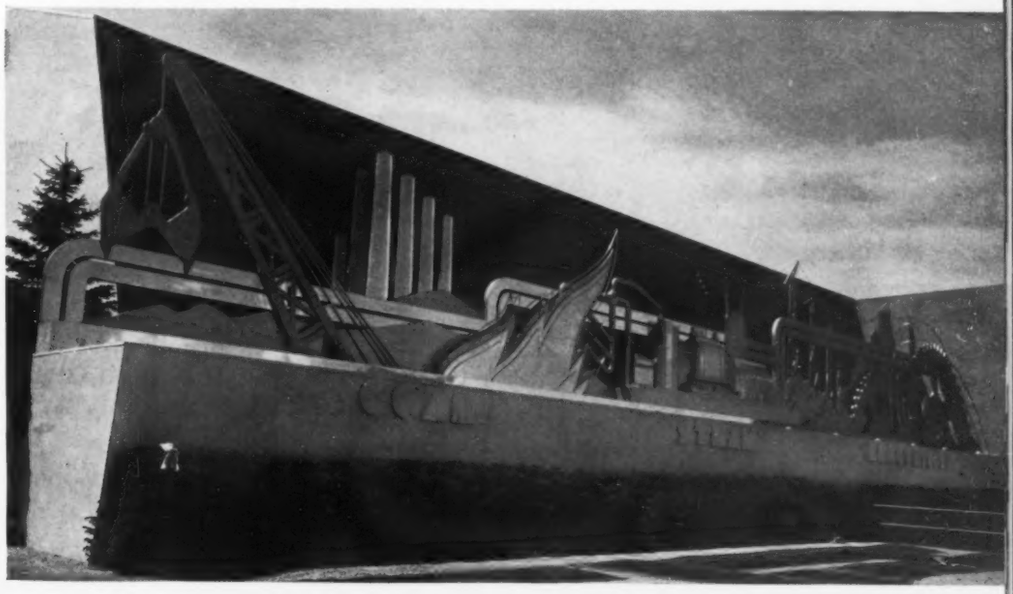
Electric Utilities Tell Their Story at New York World's Fair

CONSTRUCTIVE imagination and careful planning have given to the electric utilities' exhibits at the New York World's Fair a wide range of interest combined with effective visitor appeal. There are three of these exhibits, two of them, "Forward March of America" and an electrified farm, sponsored by a co-operating group of power companies, and the third an impressive display by the Consolidated Edison Company of New York. A service feature of the co-operating utilities' exhibit, which is daily growing in appreciation, is the supplying of itineraries for tours of the fair planned according to the interests of prospective visitors. Customers and employees of the co-operating utilities send in their names and statements of their particular interests and then, when they visit the exhibit, are given complete information in the form of a planned tour of the fair.

ELECTRICAL WORLD
May 20, 1939



Entrance arch is a transmission tower



From coal to electricity

1892 celebrates progress of ten years

Pledge for the future

At the sign of the wooden Indian

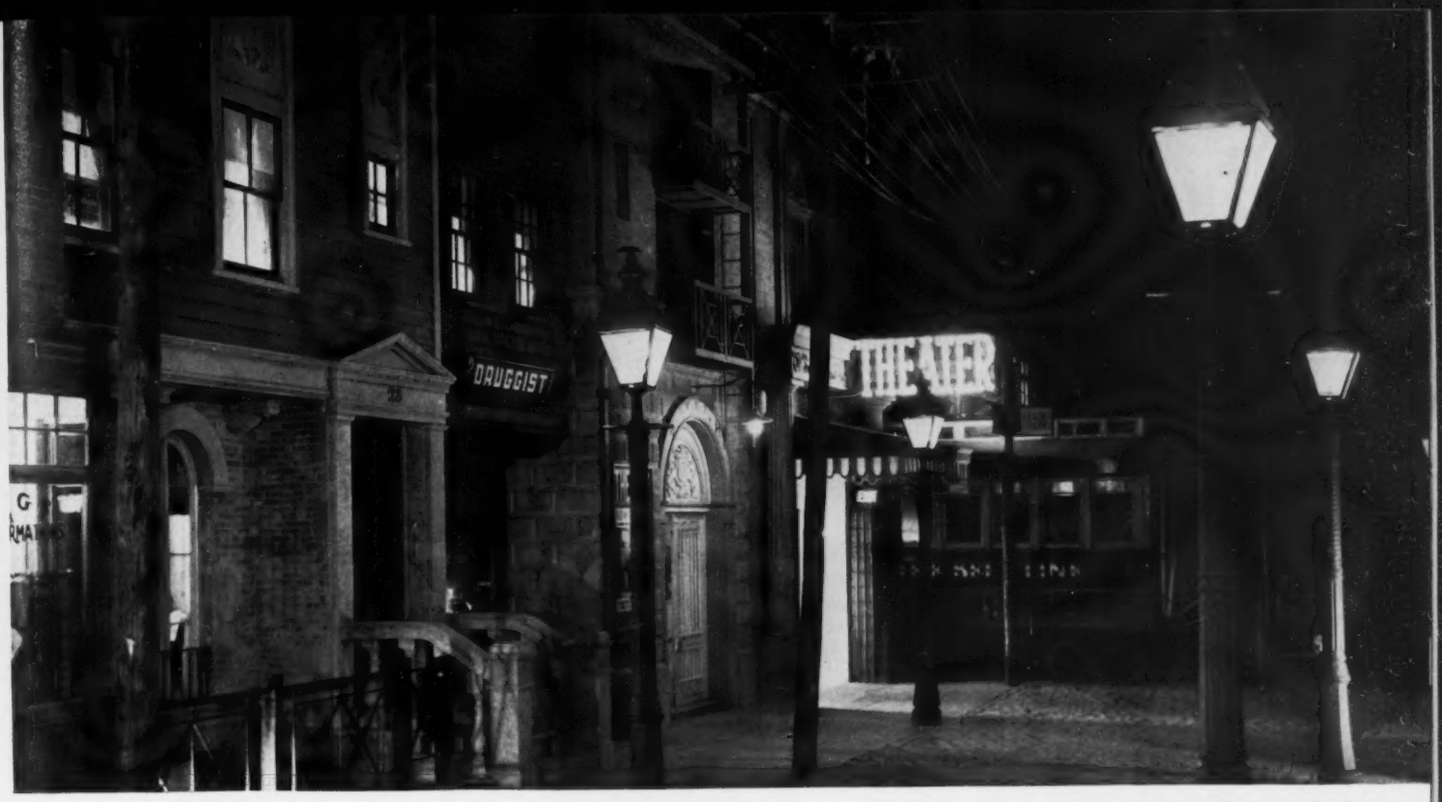
Coal oil lamps attract the shopper

Scene of Yesterday Is Background of Tomorrow

AS IF LEAVING an evening's entertainment in the old time "opery house," the visitor enters the street of 1892 under a dim carbon bulb theatre sign. Down the street are the typical dimly lit stores of the time, piled high with merchandise—a shop with women's dresses and unmentionables, a watchmaker, a harness and saddle shop, a novelty shop, a photographer's studio, a lighting fixtures store (which up to that time dealt mainly in gas fixtures and oil lamps), an apothecary, a hair store featuring wigs, bangs and transformations.

Through the lace curtains of the "parlors" the dimly lit interiors are visible. The basement kitchens, too, relive the time. In one kitchen a woman can be seen washing clothes over an old washtub, adding them slowly to the steaming washboiler on the coal stove nearby; in another kitchen a woman is ironing, going back and forth to the stove with the sad-iron as it cools.

At the end of the street is the office of the electric light company, which is celebrating the tenth anniversary of the electrical industry. One of the windows has a display of incandescent lamp bulbs which the company is offering at the amazingly low price of 80 cents each, and urging customers to make use of electric lighting in their homes. "Electricity is the light of today and of the future," a placard proclaims.



"White Way" street in 1892

Rub-a-dub-dub

The "sad" iron, indeed

Oh! for an electric hair dryer

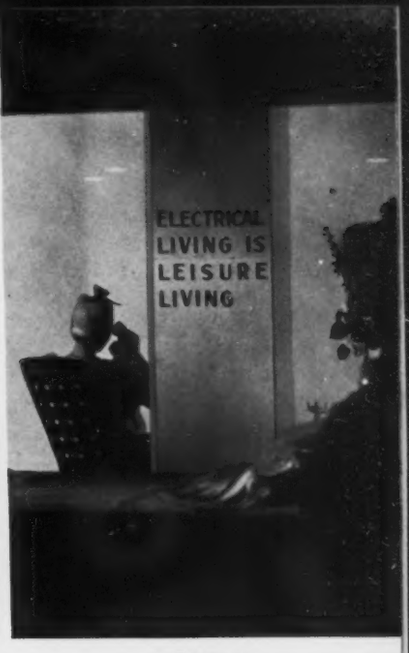
Gossip in the parlor

City of the future

The modern street

Says public service and means it

Charm



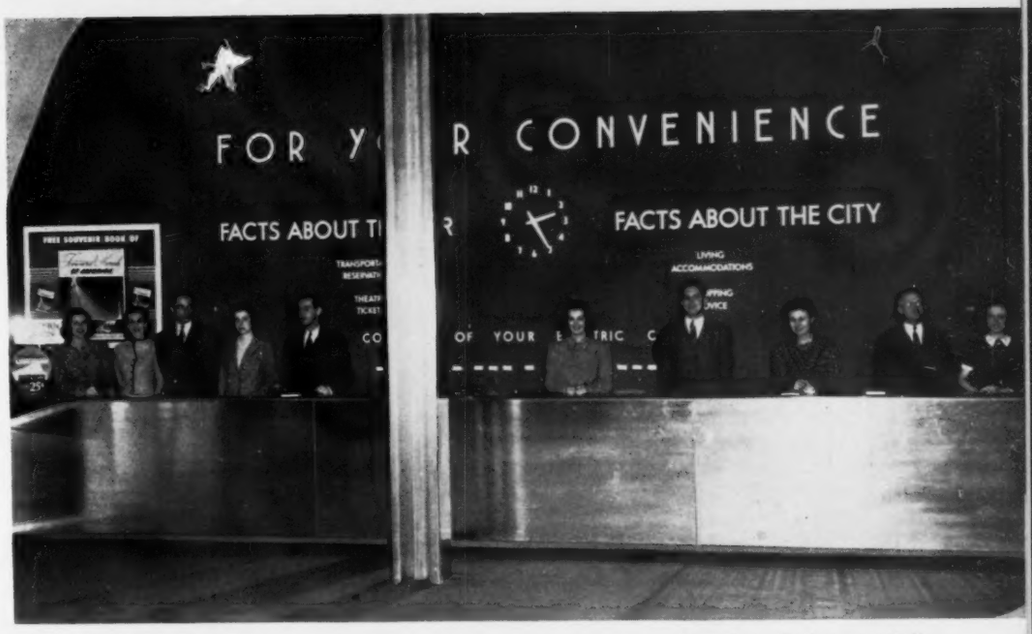
Leisure

Tomorrow's Promise, Today's Accomplishment

LEAVING THE STREET of 1892, visitors walk through a curved passage, from which they can neither see what they just left, nor what lies ahead, and illusion temporarily is suspended. They emerge suddenly into the office of a modern electric company, spacious and brightly lighted. Here the fulfillment of the pledge made in 1892 is dramatically presented. In a unique and arresting display the contribution of electricity to the Forward March of America is seen—electricity in the home, commerce, industry, medicine and surgery, aviation, transportation, motion pictures, television, telephone, telegraph, cable, radio, safety beacons for guidance and protection on land, sea and in the air, etc.—electricity's place in the world of today.

Leaving the modern street, visitors find themselves in the Rocket Room—the climax of the exhibit. Here all the magic of light, color and music are woven into an impression of transcending beauty, which must be seen and heard to be appreciated, for description falls far short.

From the Rocket Room visitors emerge to a spacious and attractive lounge. The windows in the lounge are the portholes underneath the waterfall, so that a constant cascade of water is visible. A personal service bureau for the convenience of customers of electric light companies is maintained in the lounge. Passing out of the lounge through a circular tunnel of curved glass, 18 ft. in diameter, which crosses a moat, the visitors leave the building through the waterfall.



Service to the visitor

Exit through the waterfall

The farm kitchen is a joy

The greenhouse

Quick freezing on the farm

Utilities Show an Operating Farm, Completely Electrified

A PRACTICAL working farm, with a farmhouse and buildings, completely equipped, cattle, horses, chickens, every last thing one would expect to find on a farm, even to the flower and vegetable garden near the house—all on less than one acre and showing more than one hundred working applications of electricity—is an important element in the electric utility story at the fair. In this exhibit all of the common uses of electricity and many new ones, tested and proved practices which are within the means of the average farmer, are assembled in a complete working unit.

The farmhouse is an attractive two-story frame structure, with a tile terrace. On one side is a flower and vegetable garden; apple trees and elms make a picturesque setting for the house, and maples in the pasture lot provide convenient shade for the cattle. At one end of the plot, grouped for convenience and efficiency, are the silo and barn, with a bull exerciser at one corner of the barn, the milking parlor, dairy room, workshop and horse shed; at the other end of the plot, the poultry house, brooder house, greenhouse, hotbeds, community packing house and the orchard.

In the center of farm life, the farmhouse kitchen, scientific planning is evident in the location of each piece of equipment—designed to conserve time, labor and footsteps. The electric range, the sink and electric dishwasher are on the same working level, making a complete working surface around the kitchen, which every housewife knows is important for efficient work. Underneath are cabinets and an electrically operated disposal unit for garbage. The kitchen is also equipped, of course, with all of the smaller appliances, such as mixing bowls, grinders, coffee maker, toaster, and many others; an exhaust fan helps keep the kitchen cool and free of odors—all adding to comfort and efficiency.

The electrified dairy shows all steps in milk production. After being washed and cleaned in the stable, the cows go down a passageway to the milking parlor of white tile and concrete, spotlessly clean. This is a small room on the side of the barn, just large enough for two cows standing tandem in their stalls, with the operator working from a pit on a lower level. The front of the parlor is of glass, so that the complete milking operation is visible.

In this milking parlor a modern magnetic combine milker takes the "arm-ache" out of the hardest job on a dairy farm. The milk is drawn into a glass container, where it is weighed without being exposed to the atmosphere. After it is weighed, it is drawn off through sanitary pipes into the dairy room. From this container it goes to a clarifier, which takes out any possible foreign matter; through the electric pasteurizer, through the irradiator to add vitamin D, and then it is automatically bottled and put in the cooler.

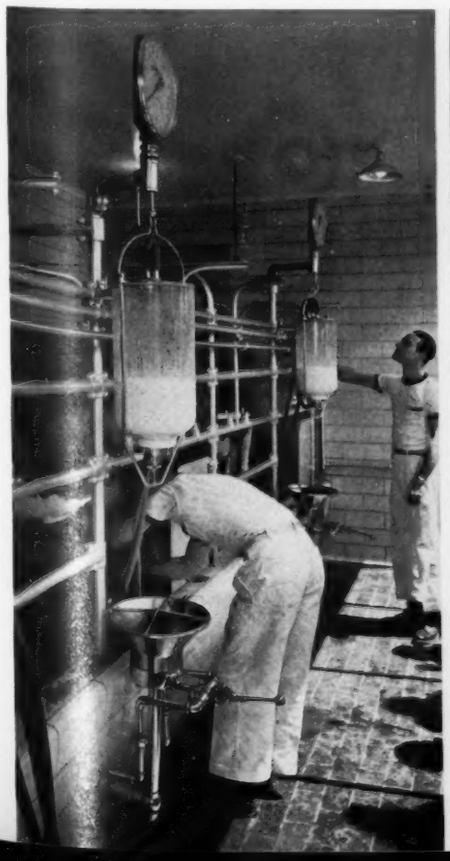
In the poultry house a complete production unit is shown, some of the hens in laying batteries and some in the conventional type laying house. The incubator in the service room of the poultry house will have chicks hatching twice a week so there will always be new chicks to put in the battery brooder, which is also in the service room. Some of these chicks are kept in an electric hover brooder in a separate brooder house just outside of the main poultry house.

To complete the installation, there is an egg cleaner and grader and latest type candler; also scalding and waxing equipment for removing feathers in preparing broilers for market.

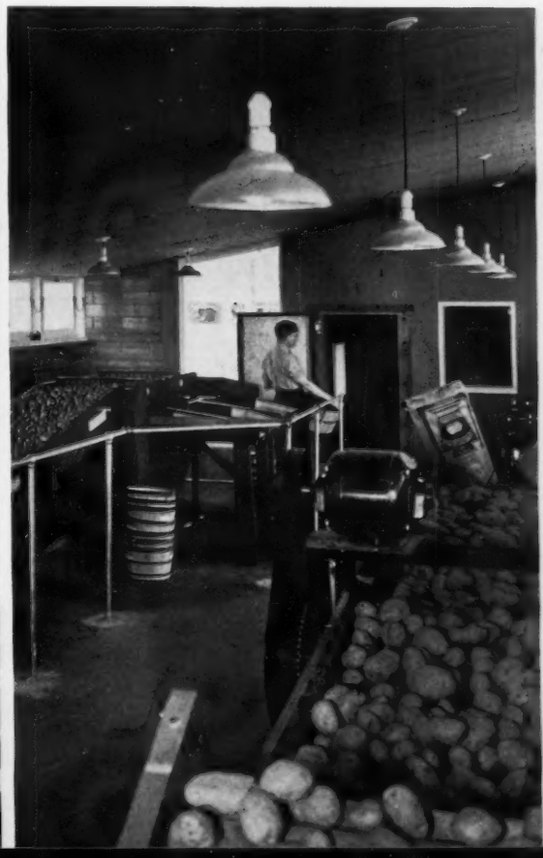
All of this equipment is so arranged that it conserves space and labor and still makes a complete poultry unit. Ultra-violet lights and modern ventilation equipment add to the health and sanitation of the flock.

Sanitary, no end

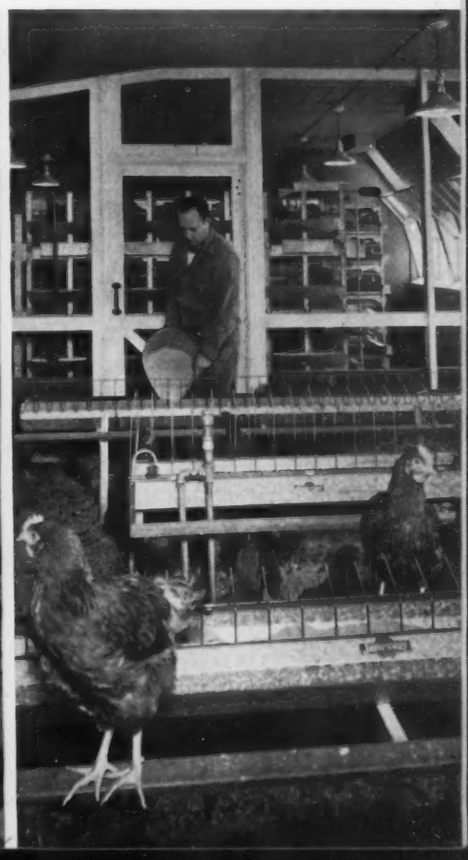
Milking, modern style



Potato processing



All home comforts for Lady Hen



Consolidated Edison Exhibits World's Largest Diorama

Diorama detail

PRINCIPAL FEATURE of the Edison display is the world's largest diorama, "The City of Light." This is a colored, lighted, animated architectural model of the New York metropolitan area containing more than 4,000 buildings. Breath-taking in sweep, the model's length is nearly that of a city block. Its height exceeds that of a three-story building. From skyline to subway it provides a realistic picture of New York. Motion, light, sound effects and a musical background are synchronized with narration.

To heighten the spectacle's dramatic interest, six-car subway trains, protected by block system safety switches, speed under the city streets at the scale equivalent of 30 miles an hour. Miniature elevators rise in Manhattan office buildings, to epitomize the extensive vertical transportation of the city.

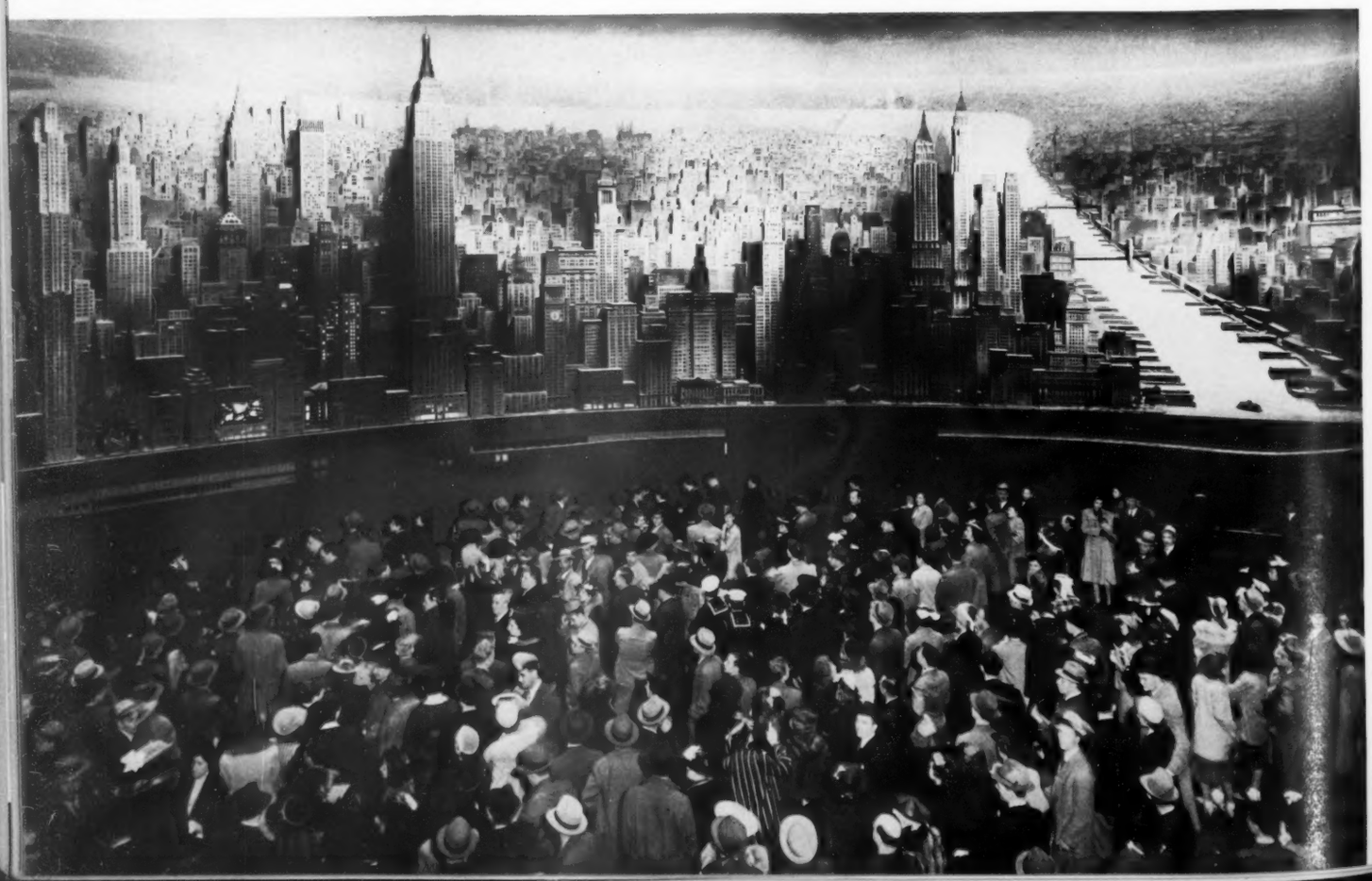
Times Square blazes with light. Ocean liners lie at river piers. Motor traffic flows across suspension bridges from Manhattan to Brooklyn. Lighting effects herald a mid-day thunderstorm. Transparencies permit the introduction of miniature stage productions of a hospital operating room and other city life scenes, throwing into bold relief the part played by Consolidated Edison in the community.

Additional to the diorama, striking presentations of company services and activities are shown. Among them a water color mural of heroic proportions shows an airplane view of the metropolitan area. Another displays "Bill Jones," an average Edison employee, and another constitutes a report to customers on company operations. Then there are the "Penny Parade" and the golden picture "Metropolis."

ELECTRICAL WORLD
May 20, 1939

Water ballet facade of Edison building

Part of the great diorama



NEWS OF THE WEEK

Sign Contracts in Sale of Tennessee Utility System

Willkie says "Peace, it's wonderful," but not necessarily assured to rest of industry in Tennessee valley — TVA and municipalities prepare for giant experiment in public ownership

The gigantic experiment in municipal ownership and operation of electric utility properties, backed by the government's socialized power project in the Tennessee Valley, moved a step toward completion last week as the TVA, municipalities and co-operative associations signed contracts to purchase the facilities of privately owned utilities in the area.

Major significance was the signing of the contract for the purchase of Tennessee Electric Power Co. for $78,600,000 with the actual transfer of properties contingent upon enactment by Congress of supplementary legislation making available financing for the acquisition of properties by the TVA.

Payment in New York

Representatives of thirty municipalities and rural co-operatives joined with Dr. Harcourt A. Morgan, chairman of TVA, and Wendell L. Willkie, president of Commonwealth & Southern Corp., in signing the contract. Actual transfer of the properties will take place in New York City on payment of the entire purchase price on June 20 "unless another date not earlier than June 1 or later than June 30" is agreed upon.

After he had affixed his signature to the contract, Mr. Willkie commented: "As Father Devine says, 'Peace, it's wonderful.'" However, he pointed out that "peace is not necessarily assured to the rest of the utility industry in the Tennessee valley" by the signing of the contract. Negotiations for the sale of certain properties in Alabama and Mississippi are expected to begin shortly, Mr. Willkie declared. "We are hopeful that TVA will agree to a limitation of the territory in which it hopes to operate."

Mr. Willkie said that the company had maintained that the government should not go into the power business, but that he had accepted the inevitable in good spirit. "We ask for the new owners from our organization the same spirit of loyal and efficient service which they have given us in the past," he said. Mr. Willkie pointed out that it was most gratifying that the TVA and various municipalities had given assurance that the bulk of the utility employees would be retained in their present capacities.

Memphis Signs Contract

The contract for the sale of the Memphis Power & Light Co. properties to the city of Memphis and the TVA was signed last week. Actual transfer of the gas and electric properties is scheduled some time between June 15 and July 1.

Paul B. Sawyer, president of National Power & Light, parent company of the Memphis utility, said that the Memphis bonds would be called as of the closing date, which will be set as soon as the Federal Power Commission approves the sale.

Under the contract, Memphis Generating Co. will take over the steam generating plant, TVA will pay $2,110,000 for transmission facilities and Memphis will pay $15,250,000 for all other gas and electric properties. Memphis will receive bids on June 13 on $17,000,000 of bonds to finance the purchase.

Utility Officers Resign

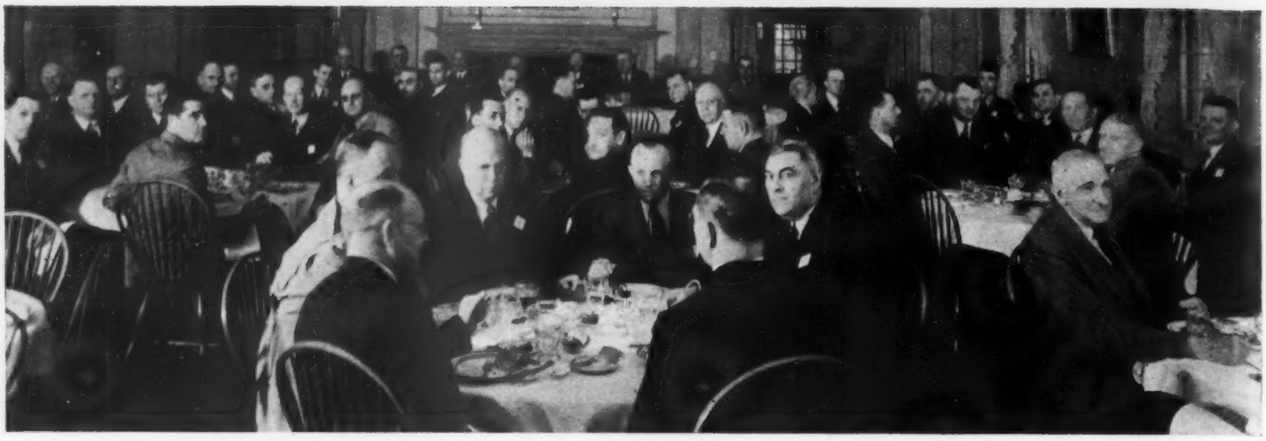
At a joint conference held in New York last Tuesday of executive officers of North American Co. and Union Electric Co. of Missouri it was determined that, in the interest of the stockholders of both companies, certain officers of the Union company should withdraw from their direction of the operations of that company, according to statement by James F. Fogarty, president of North American.

Louis H. Egan, president; Frank J. Boehm, executive vice-president, and A. C. Laun, vice-president, all of St. Louis, have withdrawn from the Union company.

On April 20 suit was filed in St. Charles, Mo., by Prosecuting Attorney David A. Dyer asking for forfeiture of the utility's charter and charging that the company had contributed financial aid to certain favored candidates in the municipal elections of 1937 and 1938, in violation of the state's corrupt practices act.

Mr. Fogarty said that when rumors were first circulated that the Union company had made contributions of a political nature Mr. Egan requested the SEC to investigate the charges. The SEC started an inquiry, which is still in progress. The public hearings by the SEC have been postponed pending a decision on constitutional questions now before the courts in Washington.

It was the sense of the conference, Mr. Fogarty said, that while these matters are being clarified the officers of the Union company will want chiefly



FARM ELECTRIFIERS—The New England Rural Electrification Committee at its recent meeting at Amherst, Mass., at which specialists discussed the rising tide of farm power acceptance and expanding markets for electric service in this load-building field

to concern themselves with all of the details of the inquiry, and that therefore they cannot be expected to continue to give their time and attention uninterruptedly to direction of the operations of the St. Louis utility.

Provisions of the utility act forbid any registered holding company or subsidiary to contribute directly or indirectly for political purposes. The SEC filed charges against the Union company on April 5 charging the utility with making political contributions in violation of federal law.

•

NEMA Opens Meet with 500 Present

With nearly 500 in attendance the NEMA spring meeting at Hot Springs, Va., this week was the largest held in the past five or six years. More than 80 divisions, sections, group and committee meetings were scheduled.

Because of conflicting viewpoints it was decided to refer the question of holding a NEMA show to the eligible membership for letter ballot.

A proposed draft of revised NEMA policy regarding association activities in connection with proposed national and state legislative activities has been prepared for comment and criticism of the membership and executive committee at the June meeting.

•

Danville Plant Test

Danville's municipal hydro-electric power plant at the Pinnacles, in Patrick County, Virginia, underwent last week its first examination by its builders since it was put into operation almost a year ago.

•

Ready for TVA Power

Aberdeen, Miss., has completed the construction of its $85,000 municipal system to distribute TVA power.

Power Use on Farms Discussed at Meet

More than 60 members and guests attended the recent meeting of the New England Institute for Rural Electrification convened at Massachusetts State College, Amherst, to discuss current progress in developing farm applications of electricity from diverse viewpoints. F. L. Rimbach, director of rural development, New England Power Service Co., was general chairman.

Four sessions were held, in which commercial refrigeration, electric sterilization, electric brooding, power applications in hay chopping and rural service men's problems were leading themes. Major interest centered in the prospects of electric storage for the farm with both quick freezing and cold storage facilities. This subject, which has notable load-building possibilities, will be followed up through the cooperation of the New England Power rural service department and the engineering department of Massachusetts State College.

The annual dinner, held at the Lord Jeffrey Inn, was featured by addresses from President Hugh P. Baker of the State College, G. F. E. Story, Worcester County extension agent; W. C. Bell, vice-president New England Power Association; C. B. Jordan, president Massachusetts Farm Bureau Federation; George Cable, editor *Electricity on the Farm;* G. F. Farley, Bay State 4H Club leader, and F. J. Sievers, director M. S. C. experiment station.

•

Utilities Reject Request to Support Funds Plea

Utilities operating in Pennsylvania told the state utility commission that they do not mix in legislative or administrative questions, in reply to an effort by the commission to ascertain whether the utilities would support a plan to increase the appropriation of the commission to cover special investigations.

The commission sought support in its attempt to restore some of its funds cut by Governor James in his budget message. The commission asked whether the utilities "would be willing to solicit actively the administration's support for an appropriation of $1,800,000 for ordinary expenses and a revolving fund of $200,000 to cover special investigations such as rates, original costs and continuing property studies."

•

Consolidated Edison Makes Change to Oil

Consolidated Edison Co. of New York, Inc., intends to discontinue certain of its powered fuel boilers and convert them to oil, Floyd L. Carlisle, chairman, told the New York State Public Service Commission last week during hearings on what the utilities were doing to meet the crisis brought about by the coal strike.

Mr. Carlisle said that the company is going ahead with the work and expects to be carrying one-half of the load on oil. This is a precautionary measure the company is taking so as to be in a position to meet any coal crisis which may arise in the future.

•

Regrouping Includes REA

Included in the Administration's reorganization plan calling for a regrouping of a score of governmental bureaus and agencies is a provision to transfer to the Department of Agriculture the Rural Electrification Administration, now operated as an independent establishment.

Engineers Urged to Cut Costs to Aid Revenues

President Prezzano says increased sales alone will not provide sufficient net to offset ascending expenses—New York State electrical operating group holds one-day session

Increased sales alone will not provide the net revenue to keep the utility industry financially healthy, President E. P. Prezzano told the electrical operating group of the Empire State Gas and Electric Association at a one-day meeting in New York last week. Cost of distribution, especially of service extensions, must be brought down to offset ascending expenses in every direction, he declared. Mr. Prezzano urged the engineers to aim at a horizontal reduction in basic designs and that that spirit influence all decisions on details and the smallest of jobs.

Standardize Designs

Progress in the revision of both the NESC and the NEC were reported by A. B. Campbell of Edison Electric Institute. In the former, the light and power group's plea for the logical readjustment of factors of safety through dropping the heavy area wind-loading to four pounds has been partially accepted and a committee has been set up to report on the proposal to incorporate a section on electric fences.

The program of the Consolidated Edison Co. to standardize distribution engineering design and maintenance of 150,000 poles was detailed by R. C. Rifenburg in charts and short-cut methods of ascertaining loadings and adequate strength. His conclusion is that engineering analysis of distribution pays capital and operating dividends.

Significant details of the program of 1,322 miles of lines being built in the 13,000 square miles of rural area of the New York State Electric & Gas Company were given by W. W. Perry. They are laid out on a 600-foot ruling span and as constructed average about twelve poles to the mile, using class 5 creosoted pine poles. Lightning arresters are interconnected. Voltages are 2.4, 4.8 and 7.2 kv. delta with double ratio transformers to change 2.4 to 4.8 kv. and operate 8.3 kv. wye.

Half the day was given up to round-table discussions of the underground, overhead and meter groups. A metering paper by C. V. Morey brought out the value of the new standards for low-voltage current transformers by citing the fact that these devices have grown tenfold (1,400 to 14,000), while the a.c. load on the Consolidated Edison system was doubling from 1925 to 1939. Considerable interest was manifested in five-dial registers to reduce the prevalence of dial constants on watt-hour meters.

•

Jersey Central Launches Novel Educational Plan

"Forget the Rumors, Look at the Facts" is the theme of a series of informative folders which the Jersey Central Power & Light Co. has been issuing to its employees, according to Leonard Lathrop, publicity director. The idea behind the folders is that employees, informed of the problems of company operation, can be an effective instrument in dispelling the rumors that harass the utility industry.

When the folders were started employees were asked to send in their own experiences with "rumors," and their own answers by the "facts." Monthly cash awards were made to the employees turning in the best papers. Some of the topics discussed in the folders were: Taxes, meter accuracy, safety, rates, hidden costs, fleet operation and school lighting.

•

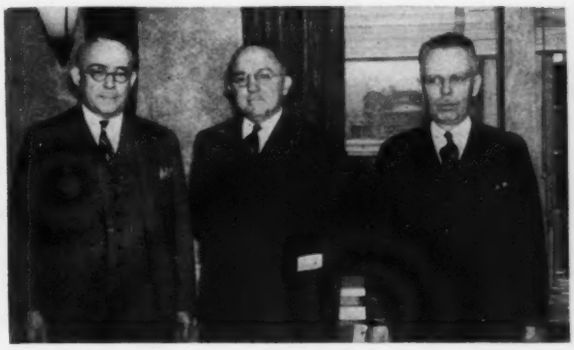
Vaughan Named Head of Boston League

James F. Vaughan, head of the P. A. Geier Company, Boston, was elected president of the Metropolitan Electric League of that city at its recent annual meeting, about 800 being present.

The announcement was made that a vigorous campaign on behalf of electric refrigeration would shortly be inaugurated under the auspices of the league.

J. J. Caddigan presided at the meeting, at which the speakers included L. L. Edgar and T. H. Carens, vice-presidents Boston Edison Co., and Neal O'Hara, noted columnist.

Other officers elected were J. J. Reddington, Reddington Electric Service Co., Boston, vice-president, and J. J. Caddigan, manager promotion department, Boston Edison Co., treasurer. New directors are F. L. Nason, Westinghouse New England manager; H. J. Walton, assistant manager Malden Electric Co.; Claude C. Matthews, New England manager Graybar Electric Co., and W. H. Kaiser, New England manager General Electric Supply Corp.



ELECTRIC OPERATING MEET—At the meeting of the electric operating group of Empire State Gas and Electric Association were seen (l. to r.) W. W. Perry, New York State Electric & Gas; E. A. LeFever, Buffalo Niagara Electric Corp.; George B. Cornell, Westchester Lighting Co.; R. C. Rifenburg, Consolidated Edison; W. B. Kenyon, Rochester Gas & Electric, and M. H. Pratt, Central New York Power Corp.

Industrial Power Group Holds Annual Conference

Power salesmen urged to make work more appreciated — Southeastern Electric Exchange committee told competitive conditions determine the level of rates for industrial power

Power salesmen were urged at the annual conference of the Industrial Power Committee of the Southeastern Electric Exchange, held in Charlottesville, Va., last week, to take their place in the sun and make their work better appreciated.

E. M. Clapp, Georgia Power Co., chairman of the conference; W. Paul Lyman, Carolina Power & Light, and M. J. O'Connell, president Virginia Public Service Company, all pointed out that no one knows all that the power salesman does, and by hiding his light under a bushel he has minimized his worth to his company. S. B. Williams, editor ELECTRICAL WORLD, spoke of several opportunities for the power salesman.

Housing Project Problems

The problems of federal housing electrification were outlined by Robert Edmond, Georgia Power, who gave consumption figures on two Atlanta projects. These ranged from 173 kw.-hr. per month for three-room apartments to 247 for six rooms. Maintenance costs to customers last year on 41,000 ranges and 70,000 refrigerators, eliminating the guarantee period, averaged $1.57 for refrigerators and $1.24 on ranges. It was expected this could be reduced to 40 cents each per year on housing projects.

An interesting sound slide film of collateral advantages of purchased power was shown by A. B. Collins of Reddy Kilowatt fame. A. B. Morgan, E.E.I. headquarters, gave a picture of the national trend of Diesel engine competition.

Written sales proposals, whether given to the customer or not, have a value in fixing the approach in the mind of the salesman, according to H. M. Brusman, Ebasco Services, New York.

Power rates differ geographically, according to T. L. Bissell, Alabama Power, because competitive conditions determine what the power rate levels will be if the utility is to hold and secure its share of the business.

H. C. Thuerk, Utility Management Corporation, New York, suggested that if power sales are to be profitable, system load curves must be analyzed to determine available capacity and then selective selling applied.

The application of infra-red heating to automobile paint drying was described by P. F. Swasey, Virginia Electric & Power, Richmond. H. O. Burnside, Walker Electrical, Greensboro, discussed the power and light problems of full-fashioned hosiery mills.

•

Chicago Utility Plans New Generating Unit

As part of its $75,000,000 construction program over the next three years, Commonwealth Edison Co. will proceed at once with the completion of a fourth generating unit of 105,000 kw. capacity at its Powerton station, near Pekin, Ill., according to James Simpson, chairman.

Mr. Simpson said that this additional capacity, which is part of the program to add 200,000 kw. to the system, will be ready for service in the fall of 1940.

A new 220,000-volt transmission line will be constructed to connect Powerton station with the Crawford station in Chicago, a distance of 147 miles. Actual construction will be started as soon as necessary engineering work can be accomplished, which will be within the next 30 days, Mr. Simpson declared.

The Chicago utility has placed orders with Combustion Engineering Co. for additional boilers to be installed in the Northwest station in Chicago.

•

Rules Invalid Tax for Use of Streets

The Court of Appeals at Galveston, Tex., has declared invalid an ordinance of the city of West University Place, Houston suburb, which places a 4 per cent receipt tax on utilities for use of the streets in that community. The ruling reversed that of a district court which several months ago upheld the ordinance on a test suit filed by the Houston Lighting & Power Co., in which West University Place was joined by the city of Houston in defense.

In reversing the district court the appellate tribunal held the ordinance charging rental fee to utilities for use of the streets conflicted with a general statute of Texas which directly grants the use of streets as easements to the public utility for the rendition of its services. The court also held that the state Legislature retained control of the utility's franchise and had not delegated it to the city of West University Place. The consensus of opinion was that if the ordinance had been ruled valid utilities all over the state would have faced tax increases for street rental purposes.

•

California Edison Will Extend Line

Southern California Edison Co. will extend its Boulder transmission line, just completed, 27 miles into highly developed Orange County, constructing a second receiving station near Stanton, and completing the job by October 1.

Fred B. Lewis, vice-president and general manager, said the work will involve expenditures approximating $2,500,000.

The station, to be known as Barre, will cost about $1,500,000 and will receive power through the 27-mile extension of 220-kv. line from Chino, present terminus of the 233-mile line from Boulder. Capacity of the new station will be in the neighborhood of 75,000 kva. Nine 66-kv. circuits will distribute to substations in Orange County at Katella, Fairview, Fullerton, La Habra, Atwood, Ocean View, Irvine and Los Alamitos.

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FPC Cites Otter Tail Co.

FPC has directed the Otter Tail Power Co. to show further cause why the rates and charges assessed and collected by the company for electric energy furnished to the city of Fergus Falls, as provided in a rate schedule on file with the commission, should not be made available to Marvin, S. D.; Lake Park, Odessa, Breckenridge, Barnesville and Ortonville, Minn.; Roberts County Power Co. and Minnesota Utilities Co.

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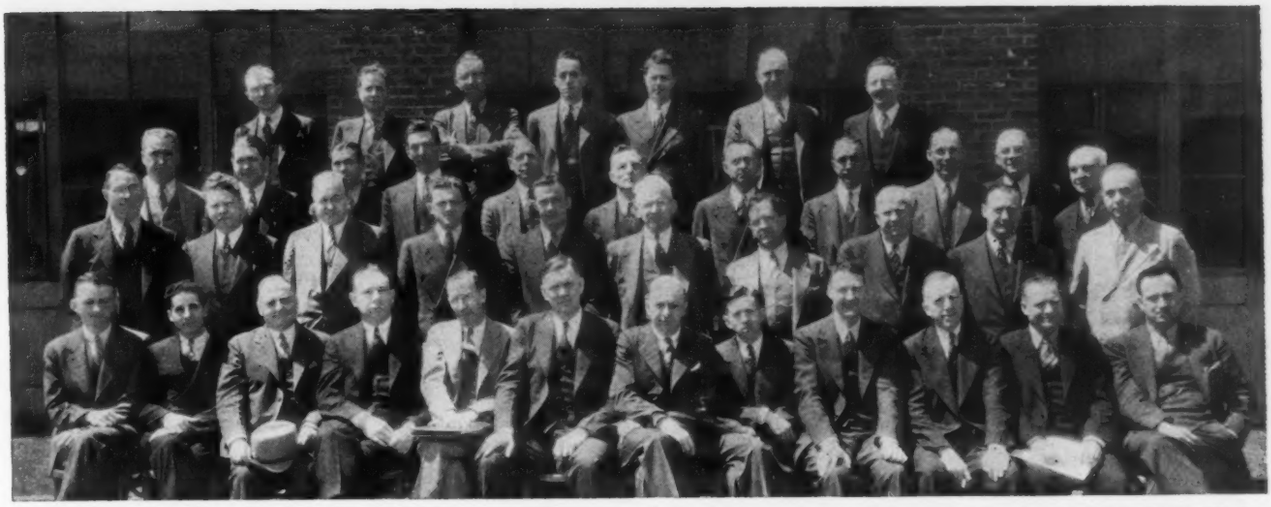
Honor William S. Barstow

In grateful appreciation of his many benefactions to them, the Engineering Societies Library Board (New York) honored William S. Barstow at a dinner this week. About 110 attended the dinner, at which Gano Dunn presided and Wendell L. Willkie and Albert R. Mumford, president Engineering Societies Library Board, were speakers.



ENGINEER GUESTS—Power Engineers Association inspects industrial electric heating installations at General Electric River Works, Lynn, Mass., following talks on progress by C. L. Ipsen, Schenectady, and A. A. Britain, Lynn. L. to r., front row—R. H. Holmes and A. J. Oliviera, G.E., Lynn; J. E. Spike, Cambridge Electric; H. M. Chatto, G.E., Boston; L. H. Knapp, Hartford Electric; C. L. Ipsen, G.E.; H. E. Ayer, Lynn Gas & Electric, president of club; A. A. Britain, G.E.; J. E. McMaster, Plymouth County Electric, Wareham, Mass., secretary-treasurer; J. G. Trudinger, G.E., Lynn; P. N. Rugg, Boston Edison, chairman club committee on industrial electric heating; J. V. Dempsey, Central Vermont Public Service, Rutland

Business Rise Shown by New Jersey Utility

Improvement in industrial conditions in the New Jersey territory served by Public Service Electric & Gas Co. is indicated by the increased consumption of power and gas fuel by manufacturing and business enterprises.

In the first four months power sales were up 16 per cent, while gas sales showed a rise of 13 per cent over the 1938 period. Output in April was at a record for that month.

The company's industrial bureau reported that 30 new industries had moved into the territory during the first four months of this year.

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Asks Commission to Honor Decisions of Old Board

Attorney-General Thomas Read has instructed the new Michigan Public Service Commission to honor decisions made by its predecessor, the Public Utilities Commission, during Supreme Court litigation over the commission's standing. Attorney-General Read said every act of the old commission, prior to April 12, when the Supreme Court affirmed the appointment of the Public Service Commission, is valid as the work of a *de facto* state agency.

When the Legislature abolished the old commission the commissioners fought back in the courts, obtaining an injunction against their removal. The Attorney-General said their appeal was in "good faith and was of sufficient merit that four justices of the Michigan Supreme Court concurred with it." "It, therefore, is my opinion that the commissioners of the Michigan Public Utilities Commission exercised the functions and powers of their offices under color of authority," he held.

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Minnesota Power Defends Rates in Rural Dispute

Minnesota Power & Light Co., in its answer to the FPC'S order to show cause by May 4 why its lower rate schedule No. DP-3 should not apply to service rendered to the Northern Power Co. and the Superior Water, Light & Power Co., avers that the present rates charged these companies is fair, just and reasonable, and that any reduction in such rates would be confiscatory. The company asks the commission to dismiss the complaint.

REA wrote to the commission that the Superior utility supplies energy to an REA-financed project at a rate which is excessive, but which it could not reduce, the company stated, because of the rate schedule under which it purchases energy from the Minnesota Power & Light Co.

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Rob Utility Office

Five gunmen held up the Harlem branch of Consolidated Edison Co. of New York, Inc., last Monday, shortly before 5 p.m., and escaped with at least $10,000. More than 100 patrons and employees were speechless with fright as the gunmen completed the job in three minutes. Last December 5 another branch office of the company was held up and robbed of $12,000 in cash and $4,000 in non-negotiable checks.

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New England Group Visits G.E. Works

Industrial electric heating progress was the theme of a well-attended gathering of the Power Engineers Association of New England last week at the River Works of the General Electric Co. in Lynn, Mass.

C. L. Ipsen, manager of industrial electric heating sales, Schenectady, stated that about 100,000 kw. per year in this type of apparatus is now being sold by the company. He stressed the growing importance of the so-called "Midget" line of heating devices, which exceed larger units in total load-building value. Improvements in vitreous enamel strip heaters, Calrod heater unit applications (the Du Pont company has 8,000 kw. in one plant), glue pots, 1,200-watt soldering irons for heavy duty and high-frequency heating apparatus are rapidly enlarging the market.

Striking progress in electric hardening is being made, and the use of electric heat in connection with powdered metals and brazing is encouraging.

The organization made an extended inspection of the River Works after being guests of the company at luncheon. J. G. Trudinger, head of the maintenance engineering staff; A. A. Britain, R. H. Holmes, A. J. Oliviera and other factory engineers directed the trip, in which melting, enameling, brazing, drying and arc furnace applications were shown in various departments.

Recommend Changes in Electrical Code

A brief summary of proposals for changes in the National Electrical Code and the announcement that the interval between publications of the National Electrical Code is extended from two to three years were submitted to the National Fire Protection Association at the recent annual convention in Chicago in a report by A. R. Small, president of the Underwriters' Laboratories and chairman of the electrical committee of the association.

Extension of the period between issues of the National Electrical Code was made to allow article subcommittees and the electrical committee a full year for study of proposed changes and will, in addition, reduce the cost of publishing the Code about 50 per cent, Mr. Small said.

Proposals for changes in the 1937 National Electrical Code, submitted by the article subcommittees on May 1, will be published in July for action by the electrical committee in a meeting early in December, 1939, and the revised Code will be published early in 1940, it was reported. Some of the proposed Code changes, as summarized by Mr. Small, included:

Proposal to classify conductor insulation by temperature reached by conductor due to current flowing; proposal to recognize ability of rubber insulation to stand higher temperature than now existing; recognition of certain synthetic insulating compounds, and recognition of use of reduced thickness of certain classes of insulation. Also to be considered is higher allowable currents on some of the smaller conductor sizes and proposed recognition of the effect of temperature rise on the number of conductors in raceway.

Discussion of the committee report by Dr. Morton G. Lloyd, U. S. Bureau of Standards, brought out that another proposal will deal with a section controlling the use of electric fences. A testimonial dinner was given to Franklin H. Wentworth, retiring secretary-treasurer and managing director of the National Fire Protection Association, at which he was made an honorary life member of the association.

A code pertaining to maintenance, in the form of a publication separate from the National Electrical Code and the Canadian Electrical Code, would be of great assistance, George S. Lawler, chief electrical engineer, Associated Factory Mutual Fire Insurance Companies, told members of the N.F.P.A. Even if it were put out only for informative purposes it would have considerable value as a means of keeping down electrical losses and the more it could be enforced the greater would be its value.

The Associated Factory Mutual Companies records indicate that for the years 1926 to 1930 inclusive, or those immediately preceding the depression, the number of electrical fires (excluding those where lightning was the initial cause) was 16.5 per cent of the number of all fires in the United States and Canada and the electrical loss was 17.6 per cent. For the years 1931 to 1938, inclusive, that is those since the start of the depression, the number of fires of electrical origin was 19.8 per cent of the total number of fires and the electrical loss was 19.2 per cent of the total fire loss.

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William C. Stevens Dies

William C. Stevens, vice-president in charge of engineering and secretary of Cutler-Hammer, Inc., Milwaukee, died last Monday, after a month's illness.

MEETINGS

National Electrical Wholesalers Association—Annual convention, The Homestead, Hot Springs, Va., May 22-25. E. Donald Tolles, managing director, 165 Broadway, New York, N. Y.

National Association of Purchasing Agents—Annual convention, Fairmont Hotel, San Francisco, May 22-25. G. A. Renard, executive secretary-treasurer, 11 Park Place, N. Y.

Pacific Coast Electrical Association—Annual meeting, Huntington Hotel, Pasadena, Calif., May 24-26.

Northwest Electric Light and Power Association—Accounting and business practice section, Vancouver, B. C., May 26-27. Berkley Snow, secretary, 707 Spalding Bldg., Portland, Ore.

Edison Electric Institute—Annual convention, Waldorf-Astoria Hotel, New York, N. Y., June 6-8. Bernard F. Weadock, managing director, 420 Lexington Ave., New York, N. Y.

Wisconsin Municipal Utilities Association—Annual convention, Plymouth, Wis., June 6-7. J. J. Jedwabny, secretary, Menasha, Wis.

Canadian Electrical Association—Annual meeting, Digby, Nova Scotia, June 21-24. B. C. Fairchild, secretary, 804 Tramways Bldg., Montreal, Que.

International Commission on Illumination—Scheveningen, Holland, June 12-21. U. S. National Committee, A. A. Brainerd, executive secretary, c/o Philadelphia Electric Co., Philadelphia, Pa.

Public Utilities Advertising Association—Annual convention, Belmont Plaza and Waldorf-Astoria Hotels, New York, N. Y., June 18-21.

Advertising Federation of America—Annual convention and exposition, Waldorf-Astoria Hotel, New York, N. Y., June 18-22. Henry Obermeyer, chairman program committee, c/o Consolidated Edison Co., New York.

Society for the Promotion of Engineering Education—Annual meeting, June 19-23, State College, Pa.

Economics Conference for Engineers—Annual meeting, Stevens Engineering Camp, Johnsonburg, N. J., June 24-July 3.

American Society for Testing Materials—Annual meeting and fifth exhibit of apparatus and instruments. Chafonte-Haddon Hall, Atlantic City, N. J., June 26-30. R. E. Hess, assistant secretary, 260 South Broad St., Philadelphia, Pa.

American Institute of Electrical Engineers—Combined summer and Pacific Coast convention, San Francisco, Calif., June 26-30. H. H. Henline, national secretary, 33 West 39th St., New York, N. Y.

International High-Tension Conference—Bi-annual meeting, Paris, France, June 29-July 8. F. Attwood, president American National Committee, Ohio Brass Co., New York, N. Y.

American Society of Heating and Ventilating Engineers—Semi-annual meeting, Mackinac Island, Mich., July 4-6. Society Headquarters, 51 Madison Avenue, New York, N. Y.

Program for PCEA Meeting Announced

Despite the unexpected change in the time and place of the Pacific Coast Electrical Association's annual meeting, the program arranged by H. S. Warren, general convention chairman, is virtually unaffected. It covers an exceedingly wide range of interesting subjects.

At the opening meeting on Wednesday morning, May 24 Leroy A. Grettum, Eastern Oregon Light & Power Co., will discuss "Present Conditions and Future Tendencies of Electric Service in the Pacific Northwest" and George A. Lewis, Rocky Mountain Electrical League, has taken for his topic "Always New Frontiers."

The operating economics section, business development section and the administrative services section will hold group and committee meetings on Wednesday and Thursday. At the general session E. O. Shreve, vice-president General Electric Co., will discuss "Industrial Progress," and N. G. Symonds, vice-president Westinghouse Electric & Manufacturing Co., will talk on "The Electric Power Utilities Tomorrow."

When the city of San Francisco decided to vote May 19 on municipal ownership, the meeting originally scheduled for Del Monte, May 17-19. was deferred to the Hotel Huntington. Pasadena, May 24-26.

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Supreme Court Denies Pennsylvania Petition

The United States Supreme Court this week denied the petition of the Pennsylvania Public Utilities Commission for reconsideration of its recent decision upholding constitutionality of the Pennsylvania temporary utility rate statute.

The commission sought a review of that portion of the decision which held that the commission, in fixing rates under the statute, interpreted the law to mean that it must comply with the "classic" judicial rules in evaluating utility property. The commission was seeking to obtain a "prudent investment" ruling.

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TVA Holds Examinations

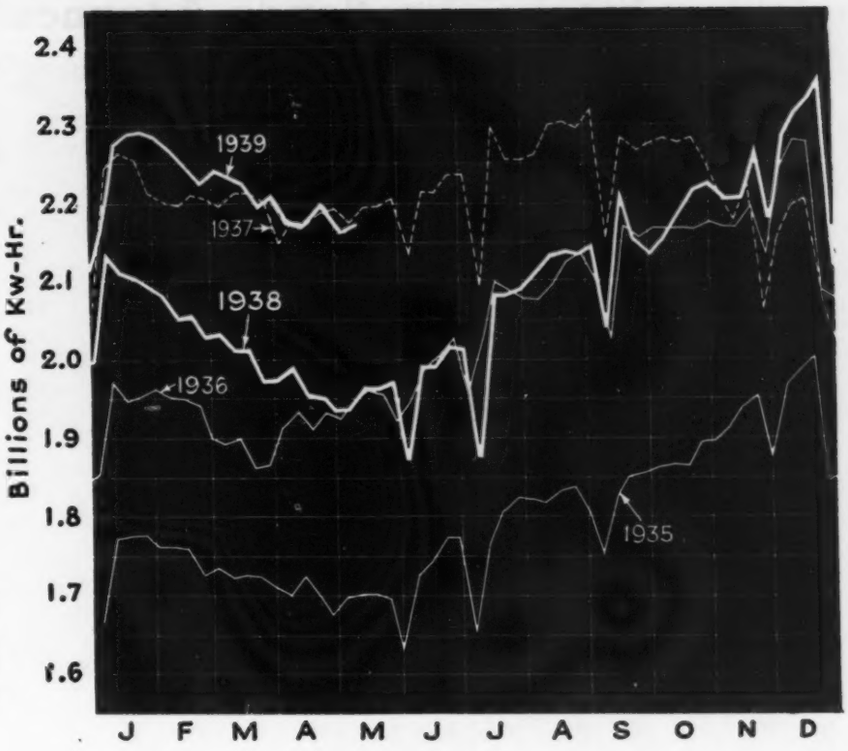
The TVA is holding competitive examination for workers on the Watts Bar dam and reservoir. At the same time the TVA will hold examinations for workers on the proposed Coulter Shoals development, to be selected if and when authorized by Congress for construction.

Output 10.3% Over '38; Slightly Under '37

Output of energy by the electric light and power industry during the week ended May 13 rose slightly above that of the preceding week to 2,170,750 kw.-hr., according to the Edison Electric Institute, but the rise did not fully match the one in the corresponding period two years ago. Production exceeded last year's by 10.3 per cent, although it was 1.1 per cent less than in 1937. It was down only 0.2 per cent however, compared with the week ended May 8 of that year.

In each of the past two years a definite upward movement was registered in May. The present close adherence of the curve to the 1937 level and the continued large excess over 1938 would seem to indicate that industrial activity is holding up fairly well. The unfavorable symptom is the absence of the annual climb to a new plateau which normally characterizes the power industry.

While gains over 1938 remain large in the industrial Eastern and Central states, they are narrower than they were a few weeks ago. The largest, 14.6 per cent, was on the Coast.



Weekly Output. Millions Kw.-Hr.

1939	1938	1937
May 13...2,171	May 14...1,968	May 15...2,195
May 6...2,164	May 7...1,939	May 8...2,176
Apr. 29...2,183	Apr. 30...1,939	May 1...2,194
Apr. 22...2,199	Apr. 23...1,951	Apr. 24...2,188
Apr. 15...2,171	Apr. 16...1,958	Apr. 17...2,173
Apr. 8...2,174	Apr. 9...1,990	Apr. 10...2,176

Per Cent Change from Previous Year

Region	Week Ending May 13	May 6	Apr. 29
New England	+ 9.2	+10.0	+15.2
Middle Atlantic	+11.1	+13.2	+14.1
Central Industrial	+10.0	+11.1	+12.8
West Central	+ 3.4	+ 3.8	+ 1.9
Southern States	+ 9.0	+ 7.0	+ 9.0
Rocky Mountain	+12.5	+12.4	+15.8
Pacific	+14.6	+20.0	+15.1
United States	+10.3	+11.6	+15.1

FPC Reports Power Statistics for 1938

Electrical energy produced for public use in the United States during 1938 amounted to 116,681,430,000 kw.-hr., or 4 per cent less than the output reported in 1937, according to the Federal Power Commission. It is pointed out, however, that from May, 1938, to the end of the year there was a steady upward trend in the total output, which rose to 10,882,094,000 kw.-hr. in December, the largest for any month of record. Output from water power was 44,834,410,000 kw.-hr., or 38.4 per cent of the total for 1938, as compared with 44,489,183,000 kw.-hr., or 36.5 per cent of the total in 1937.

Privately owned electric utilities produced 104,090,247,000 kw.-hr., municipally owned 5,239,923,000 kw.-hr. The remainder was produced by mining and manufacturing plants contributing to the public supply, railroads and railways, federal plants, co-operatives and others.

Installed capacity increased 1,907,723 kw. during the year, from 37,134,382 kw. at the end of 1937 to 39,042,105 kw. at the end of 1938, of which 33,246,341 kw. was in privately owned electric utilities and 2,631,018 kw. in municipally owned plants.

These figures supersede the preliminary estimates published in the ELECTRICAL WORLD of January 14, 1939, with which, however, they are in close agreement. The estimate of 109,000,000,000 kw.-hr. for the output of private and municipal establishments becomes 109,330,170,000 kw.-hr. and the corresponding capacity, estimated at 36,000,000 kw., becomes 35,877,359 kw.

The report also shows for each state the amount of energy received and delivered across state lines. Including small amounts crossing the Mexican border and somewhat more than 1,000,000,000 kw.-hr. received from Canada, the total interstate movement aggregated 23,261,667,000 kw.-hr. The largest amount received by any state was 2,613,427,000 kw.-hr. by Illinois; the largest amount delivered was 1,766,243,000 kw.-hr., by Maryland, with Pennsylvania, 1,694,985,000 kw.-hr., second.

Further progress was made in reducing the average consumption of fuel per kilowatt-hour, now averaging 1.41 lb. of coal, against 1.43 lb. in 1937. The most efficient steam plant used approximately 0.82 lb. of coal, or 10,800 B.t.u., per kilowatt-hour of output during the past year.

It is announced that copies of the 54-page report, stated to be the most comprehensive ever published by the commission on electric power statistics, are not available for free distribution, but will be sold by the commission exclusively at 25 cents a copy.

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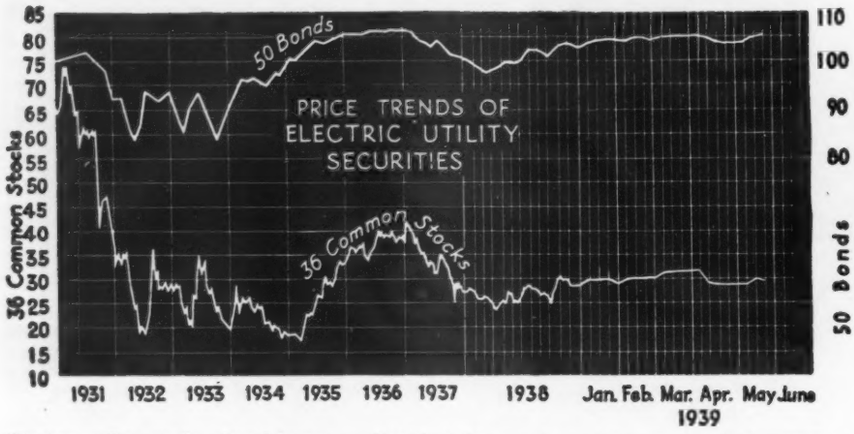
Ulen Expands to Meet Construction Activity

Entrance of Ulen & Co., engineer and constructors, into the Middle West has been announced by James H. Manning, president, who announced the opening of a Chicago office last week under the management of Vern E. Alden, vice-president, as a step in the expansion of its domestic business. Mr. Alden until recently had been with Stone & Webster Engineering Corp. in Chicago.

According to Mr. Manning, opening of a Chicago office at this time reflects the belief of Ulen & Co. officials that the nation is on the eve of an important expansion of construction activity, particularly for public utility and industrial companies.

Utility Stocks Dip, Bonds Advance


50 Bonds
PRICE TRENDS OF ELECTRIC UTILITY SECURITIES
35 Common Stocks
35 Common Stocks
50 Bonds
85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10
110 100 90 80
1931 1932 1933 1934 1935 1936 1937 1938 Jan. Feb. Mar. Apr. May June 1939

Electric utility stocks closed lower on Tuesday this week, and for the week the "Electrical World" index of common stocks was somewhat lower, off 0.2 point to 29.4; index a year ago, 26.5. Bonds advanced slightly during the week, with the index rising 0.2 point to 105.1

Authorizes Utility to Borrow from U.S.

Authority has been granted by the Public Service Commission to the New York State Electric & Gas Corp. to issue a twenty-year note for $300,000 to obtain funds to construct 250 miles of rural electric lines in 40 up-state counties. The note is payable to the United States of America in 39 equal semi-annual installments and is to bear 2.73 per cent interest annually.

The corporation was authorized to pledge as security for the note not to exceed $400,000 of its 4 per cent bonds due in 1965. The proposed construction will make service available to 1,263 customers, or an average of 5.1 a mile of extension, and is expected to produce an annual gross revenue of $50,184. There are 739 prospective farm customers and 524 non-farm customers. Up to March 1 the corporation has received requests for extensions aggregating 1,430 miles of electric lines to serve 5,600 customers, exclusive of the construction to be provided by the note.

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Chicago Utility Financing

Commonwealth Edison Co. of Chicago would have incurred only a small amount of expense if it had registered its $114,500,000 of 3¼ per cent bonds and offered it publicly instead of the private sale to fifteen life insurance companies, according to Robert E. Healy, acting chairman of the SEC.

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Refinances Large Debt

Pacific Public Service Co. has announced that its $4,500,000 debt to Standard Oil Co. of California has been refinanced as of the first of May, $300,000 of the total being paid off and $4,200,000 being refunded through a new private 3 per cent loan.

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Raises Exemption on Sale of Assets

SEC, in an amendment to the public utility holding company act of 1935, has increased from $50,000 to $100,000 the amount of utility assets which may be sold by a registered holding company, directly or indirectly, without obtaining approval by the commission prior to the sale.

The exemption, however, will be available only when utility assets within the $100,000 limit are sold to a person other than a registered holding company or subsidiary, or where the acquisition of the assets by a company in a registered holding company system has been expressly authorized by a state commission.

The commission also amended the rule to make clear that in calculating the amount of securities which may be sold without commission approval it is not necessary to take into consideration sales of securities expressly authorized by the commission. A similar clarifying amendment was adopted with relation to sales of utility securities and assets by a registered holding company or subsidiary to associate companies or affiliates.

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Calls Bonds for Payment

Portland General Electric Co. has called for redemption on June 9, at 103½ and accrued interest, $163,000 principal amount of its first mortgage 5 per cent bonds, due by extension July 1, 1950.

Files $22,000,000 Issues with Board

West Texas Utilities Co. has filed a registration statement under the Securities Act, covering $18,000,000 of first mortgage bonds, series A, due May 1, 1969, and $4,000,000 of 2½ per cent-4 per cent serial debentures, due serially May 1, 1940-May 1, 1948. Net proceeds from the sale of the bonds and the debentures will be applied toward the redemption at 102½ and accrued interest of $21,903,000 of 5 per cent first mortgage gold bonds, series A, due October 1, 1957. The excess, if any, of the net proceeds over the amount required for the redemption of the bonds will be used for additional working capital. Hearing has been set for June 1.

Niagara-Hudson Power Corp. has requested the commission to permit it to withdraw its application for an order declaring it not to be a subsidiary of the United Corp.

Litchfield Electric Light & Power Co. has filed an application asking exemption from the requirement of filing a declaration with respect to the issue and sale of $450,000 of 4 per cent, first mortgage bonds, due 1964. Proceeds from the sale will be applied to payment on an open account indebtedness to NY PA NJ Utilities Co., with which the company is affiliated.

Oklahoma Power & Water Co. has filed a declaration regarding the issue and sale of $2,000,000 of 3¾ per cent five-year notes and the issue of $2,000,000 of 5 per cent first mortgage bonds, series C, due February 1, 1948. The series C bonds are to be used as collateral to the notes.

Eastern Minnesota Power Corp. has filed a notification of registration under the Holding Company Act.

SEC granted an order approving the organization of the American Gas & Electric Service Corp. as a subsidiary service company for the American Gas & Electric Co. system.

Hearing has been set for June 6 on application of the Detroit Edison Co. under the Holding Company Act for an order declaring it not to be a subsidiary of the American Light & Traction Co., Gardner & Brown, North American Co., United Light & Power Co. and United Light & Railways Co.

Utility Reports

	Net Income 1939	1938
†Electric Pwr. & Lt. and subs.	$4,918,558	$9,092,827
*Engineers Pub. Serv. and subs.	4,612,217	3,829,350
*Gulf States Utilities	2,146,100	2,030,158
*Metropolitan Edison	3,220,652	3,170,511
*New England G. & E. and subs.	284,462	99,002
*New Jersey Pwr. & Lt.	967,364	1,338,082
*Niagara Hudson Pwr. and subs.	7,502,900	9,099,440
*Puget Sound Pwr. & Lt. and subs.	1,683,629	1,682,993
*San Diego Cons. G. & E.	1,505,640	1,231,171
†United Gas Corp. and subs.	5,468,249	9,954,140
*Virginia Elec. & Pwr.	3,613,698	3,328,663
*Western Pub. Serv. and subs.	179,301	186,862

*Twelve months ended March 31.
†Twelve months ended February 28.

OPERATING PRACTICES

Temporary Splice for TransmissionConductor

Backbone of power supply to the Los Angeles Bureau of Power and Light is the 287.5-kv. Boulder transmission line and continuity of service thus is essential. To handle emergency repairs quickly, special equipment has been designed and built by bureau personnel.

In designing this equipment, minimum weight was a primary consideration, all items being so constructed that they can be handled easily by a patrol crew of two or three men. Reason for this was that more than 200 of the 266 miles traversed by the Boulder transmission line are remote from metropolitan centers and are patrolled by fourteen two-man crews, each of which covers a section about 20 miles long.

While any number of men could be despatched by carrier communication to a section in trouble, it is expected that a single crew, using the special equipment, will be able to make temporary splices in conductors, for example, in as little as 30 minutes after reaching the location of the break. This compares to ten or twelve hours that would be required by methods employed heretofore.

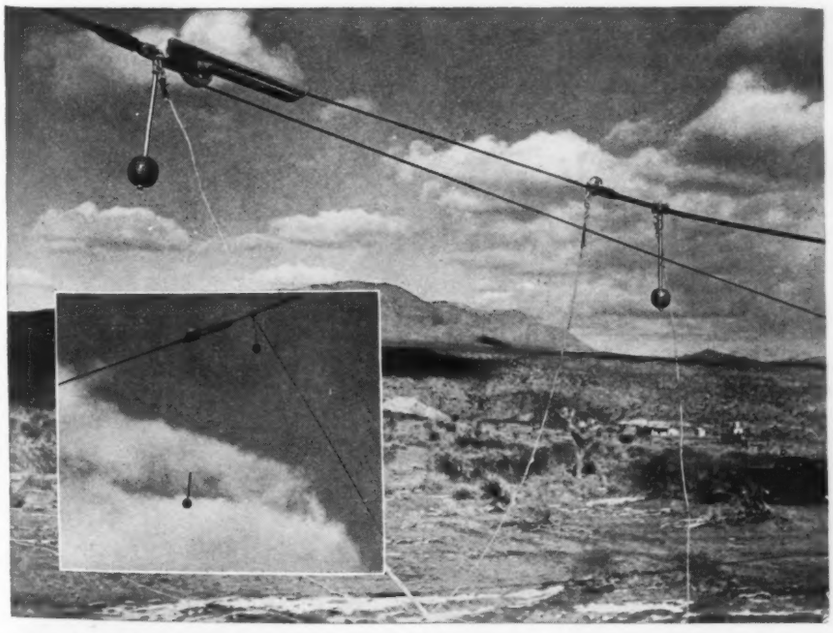
So far, the splicing equipment has not been needed, as no failures have developed in the type H-H hollow copper cable used in the two circuits of the municipal utility. However, the equipment has been carefully tested under simulated conditions on experimental spans installed at Victorville switching station and complete temporary splicing operations have been clocked three times at 30 minutes.

The splicing device which makes this speed possible consists essentially of a receptacle, attached to one end of a broken conductor, and an automatic tripping unit which engages the receptacle, attached to the other conductor section.

The receptacle is a bronze shoe which positively locks the tripping unit in place. After the two units are locked together it is impossible for them to be disengaged until the tension on the line at that point is relieved to make the permanent splice. The current-carrying characteristics of the temporary splice are comparable to that of the whole conductor and the design is such that corona is not appreciably greater than in other line hardware.

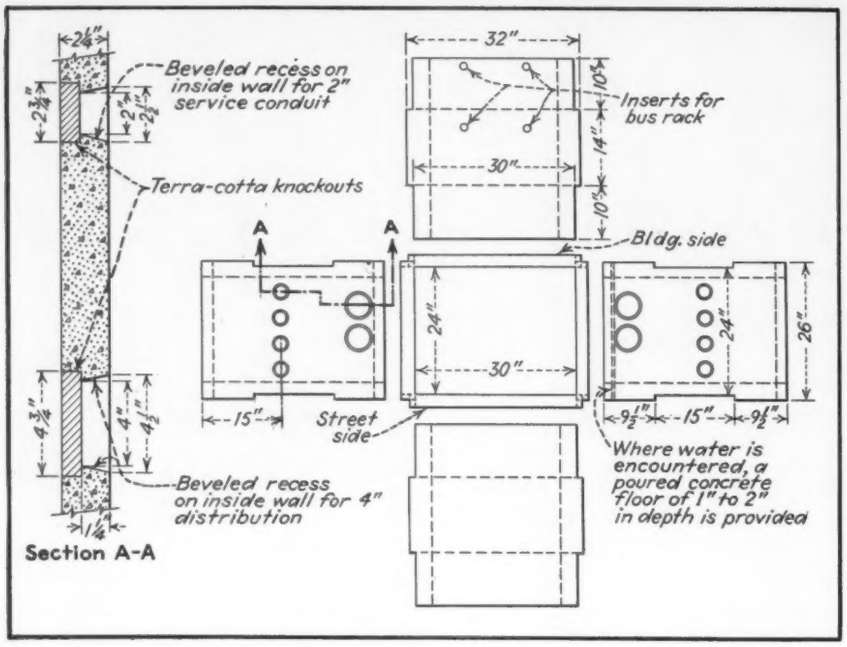
Repair procedure is as follows: (1) A dead-end clamp is attached to each end of the break; (2) the two splicing units are attached, with the tripping unit secured to a strain line (torque arms also are fastened to each cable end to prevent unwinding of the ten segments that form the hollow conductor); (3) with the strain line, the cable ends are drawn together (rising to near their original position as they do so) and made fast by the automatic latching of the device; (4) a jerk on the three handlines attached to the strain line and the two torque arms releases them, leaving only the temporary splice in place and the circuit ready for operation.

When an actual break occurs, it is



Tying the ends together

Separated ends of the conductor are being drawn together for temporary splice. Tripping device at right is securely locked in place by receptacle at left. Handlines disengage the two torque arms and the steel winch line when the cable splice has been made. In the smaller picture may be seen one of the torque arms dropping to the ground. Note handline still attached to second torque arm, which will be released next. The steel winch line already has been disengaged.



Design of precast concrete handhole

planned to leave the temporary splice in service until early the following Sunday morning, when system load is lightest for the week. Then the circuit will be de-energized and a permanent splice made.

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Precast Concrete for Sidewalk Handholes

By WILLIAM W. PREDMORE
Underground and Transmission Construction, Public Service Electric & Gas Company

Replacing former construction methods that required the field assembly of forms and the pouring of ready-mixed concrete, the underground and transmission construction department of the Public Service Electric & Gas Company is now constructing 24 x 30-in. sidewalk distribution handholes using precast concrete wall slabs. The total average elapsed time for the former construction was 28 hours, of which sixteen hours were during the period of business and pedestrian activity, as compared to the total elapsed time of two hours for the precast slab installation. The former construction methods caused considerable inconvenience to pedestrians and local business houses, which has been practically eliminated by the use of the precast slabs.

The concrete slabs are cast at the division headquarters during the season of little construction activity. Terra-cotta inserts which are easily knocked out provide for duct connections. The light weight of the members makes transportation economical and breakage loss is negligible in view of proper curing and adequate reinforcing.

Reference to the sketch will indicate the assembly of the slabs. The use of interlocking joints between the wall slabs, together with a carefully placed backfill and a steel frame and cover which serves as a roof, insures rigidity of the structure. When fluid soil is encountered a light poured concrete floor is installed, but under normal conditions a floor is not required. The sketch shows the details for a distribution handhole. In the case of handholes at cross-over locations, the cross-over ducts enter the handhole through the bottom with a 36-in. radius bend.

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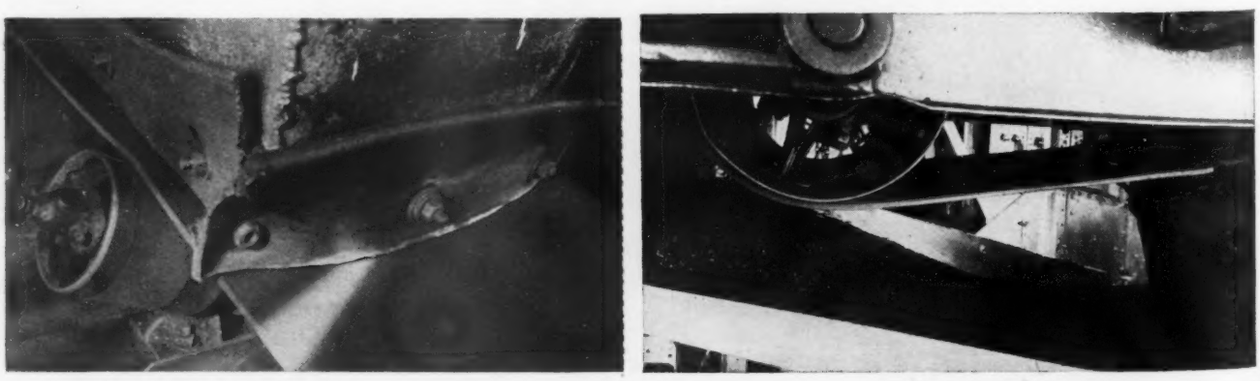
Conveyor Belt Resists Oil in Treated Coal

When the Stamford Gas & Electric Company changed to oil-treated coal, because of the higher B.t.u. transfer provided and the elimination of dust, trouble developed with the rubber-covered conveyor belt. This belt has a capacity of 100 tons per hour and carries $\frac{5}{8}$ slack 230 ft. up a 12-deg. rise. The belt softened so that it wouldn't track, slipped, stretched, changed its tension so that it had to be tightened at regular intervals, and consequently shortened the life. In addition, the oil-softened cover was easily abraded by the coal.

After five months the belt cover swelled to such an extent that the belt humped up and spilled the coal off the sides. All of these difficulties were caused by the oil in the coal; while only seven quarts are sprayed on each long ton, the conveyor belt cover absorbed so much of this oil that after five months' use oil could be squeezed out of the rubber.

So the Stamford Gas & Electric Company installed a neoprene-covered conveyor belt to see what service it would give in this location. The



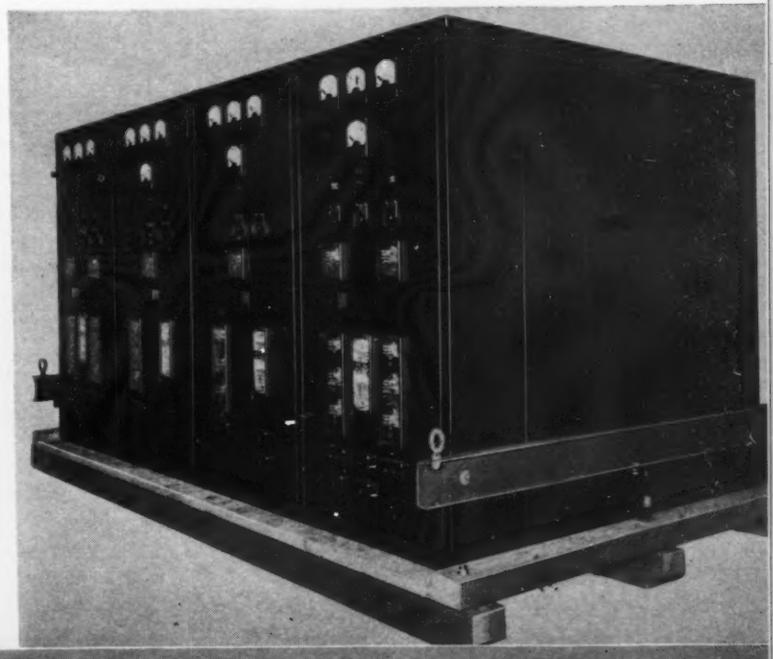
Neoprene-covered belt for conveying oil-treated coal in utility withstands abrasion
Close-up view (left) of conveyor belt passing under loading hopper shows belt after a year of service. A similar belt is used in the weighing system, where coal gets between pulleys and belt and is ground against inner surface as shown at right

BOXES, BOXES, EVERYWHERE —But What He Wants Is SWITCHGEAR

IF HE had bought G-E metal-enclosed equipment, he would now be ready to operate instead of only getting ready to install, because it's *factory-assembled.* And factory-assembled switchgear comes complete, just like a motor or generator. You simply bolt it down and connect the cables. You make a substantial saving on installation cost and avoid expensive construction delays, inevitable with piecemeal buying. You obtain a safe, reliable switchgear unit—devices co-ordinated and designed to work together.

And that's not all. You get a modern breaker—interlocks to assure proper sequence of operation for safety to personnel—a strong metal enclosure that leaves no live parts exposed—silver-to-silver contacts throughout. Specify G-E factory-assembled equipment and you get all that the latest switchgear science offers—*all in one package.*

Ask your nearest G-E representative to quote on your next switchgear requirements.



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GENERAL ELECTRIC

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new belt did not soften and slip; it did not stretch and it did not hump up, since it was not swelled to any extent by the oil. This particular belt has now been in service for more than a year and is still operating efficiently. The oil has not softened the neoprene cover; as a result, the belt has successfully withstood the abrasion of the coal.

The abrasion resistance of the neoprene cover when subjected to exposure to oil is emphasized to an even greater degree at another location in the plant where the coal is automatically weighed for delivery to the boilers. In the weighing system coal is delivered from a hopper to one end of a neoprene-covered conveyor belt. This 7-ft. belt then carries the coal to an automatic scale, which stops the delivery each time 300 lb. of coal is delivered to it.

Because of the heat in this location —the hopper is adjacent to the boilers—this belt had a neoprene cover even before the switch to oil-treated coal. In addition to heat, however, the belt is subjected to very severe abrasion. First, the hopper delivering coal to the belt holds seven tons and the pressure of this coal drags on this belt at every rotation. Second, coal gets between the pulleys and belt and is ground against the inner surface.

Despite this severe abrasion, the neoprene belt gave satisfactory service for a year before the plant switched to oil-treated coal. And now for another year it has resisted the effects of abrasion despite the possible deterioration introduced by the oil in the coal. It is still in good condition and is probably good for several more years' service.

•

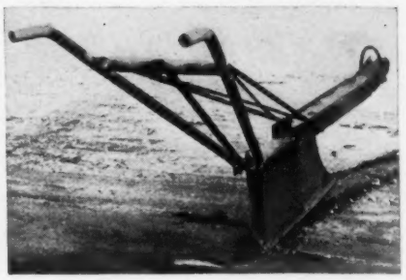
Unload Poles Safely With Hinged Skids

A hinged skid and snubbing stake arrangement worked out by the safety engineers of a large Eastern utility company has not only greatly reduced the hazards of unloading poles from railroad flat cars but has also made this task much easier to perform.

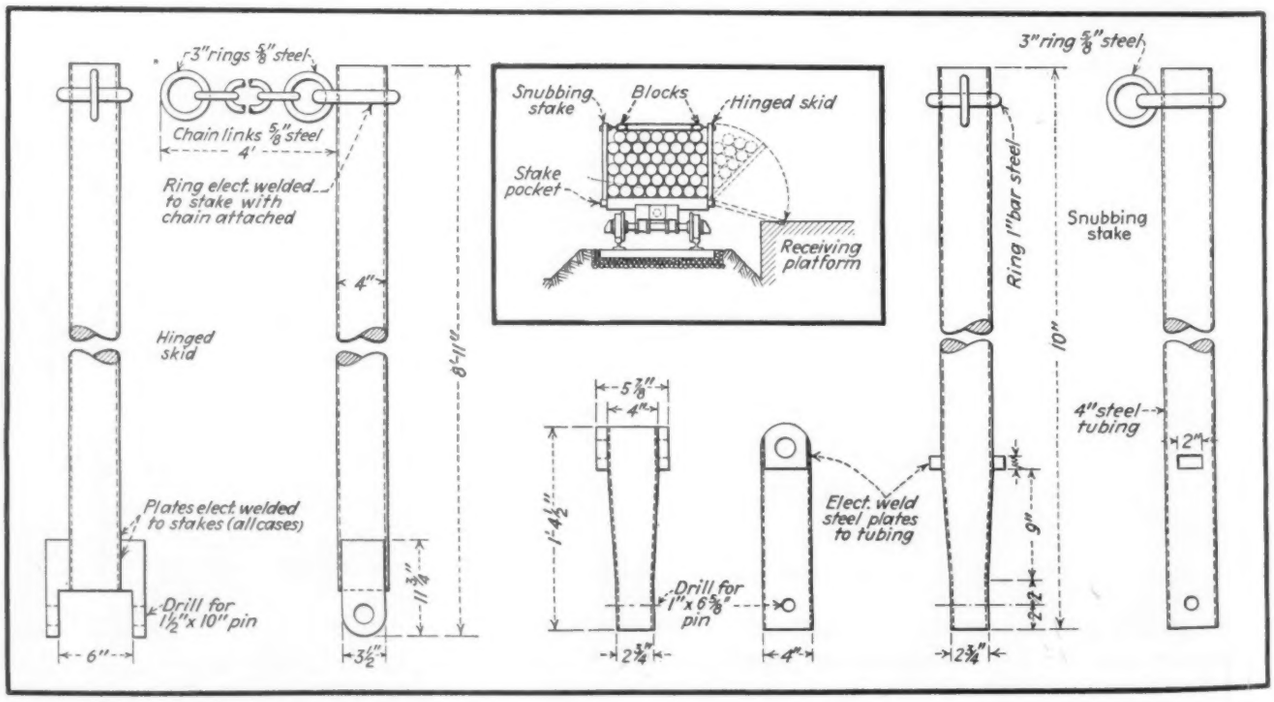
Two specially designed tubular steel stakes, hinged near one end, are placed in the stake pockets on the unloading side of the flat car with the hinge of the stake about flush with the floor of the car. These stakes are raised and held in a vertical position by a set of blocks that pass over the top of the load and fasten to two other rigid tubular stakes that have been placed in the stake pockets on the opposite side of the flat car. With tension on the blocks and these stakes binding the load of poles, the top bands on the load are cut and the hardwood car stakes that bound the poles in transit are removed—the middle one first and then the outside stakes. After these stakes are cut the unloading crew must stay on the side opposite the unloading side of the car.

With the steel stakes still supporting the load the final bindings of the load are cut by a workman standing on the ground opposite the unloading side. Tension in the blocks holding the hinged stakes is gradually eased and they are lowered equally until the stakes form skids or runners, upon which the poles may roll onto the receiving platform. With all tension on the blocks released they may be removed and the poles rolled into any desired position on the unloading platform by the crew.

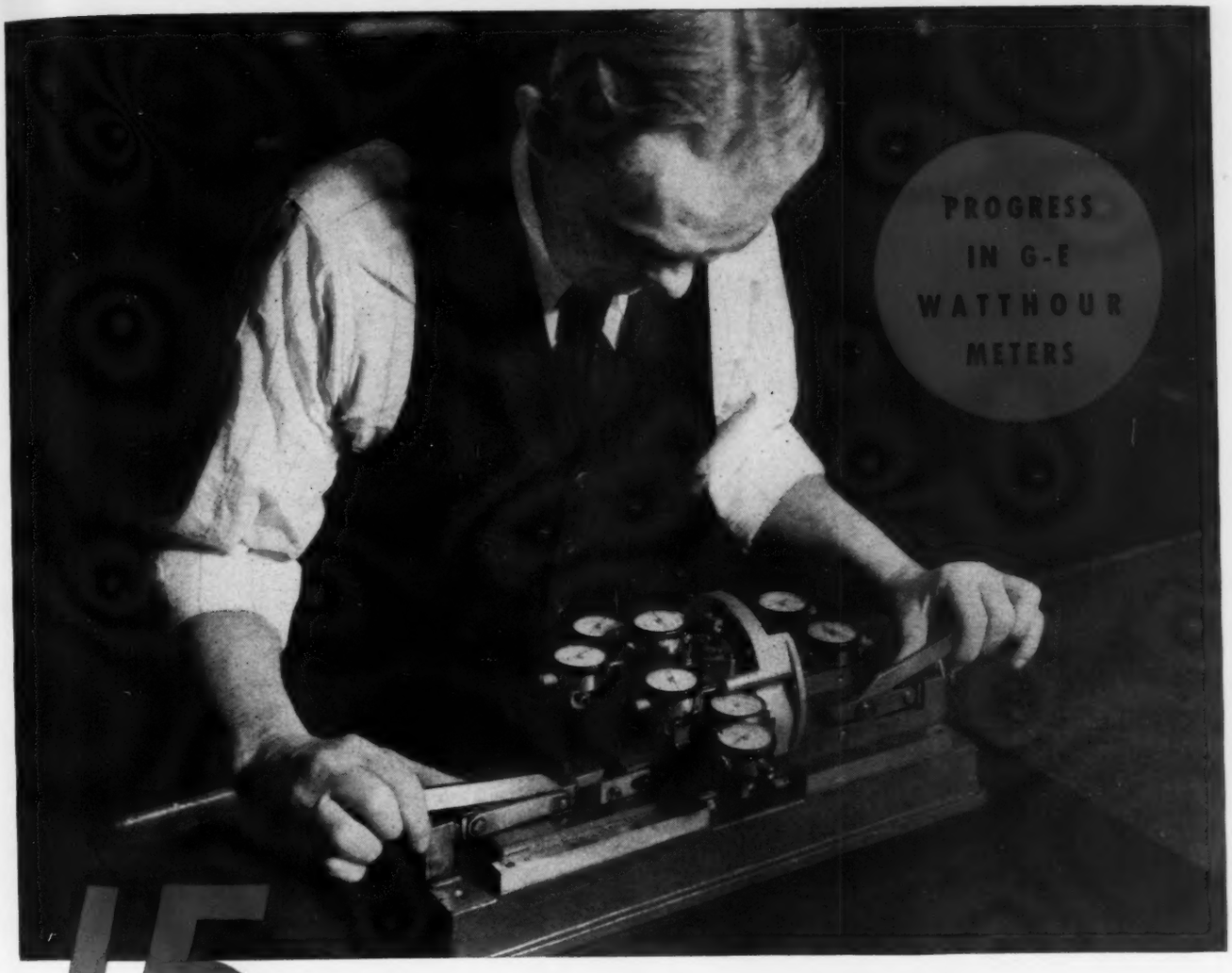
Plow Sets Cable 22 Inches Deep



The cable plow shown was made in the garage of the United Illuminating Company at Bridgeport, Conn. A standard conduit ell was welded between two floor plates with a reinforced backing of channel iron and a pipe-frame handle. Pulled by an ordinary line truck, it will place cable to a depth of 22 in. The only backfilling required is performed by running the truck over the furrow.



Hinged skid reduces hazard of unloading poles



15 DIMENSIONS GAUGED IN ONE OPERATION

Precision analyzer enables inspector to measure 15 dimensions of meter-frame casting and to determine their relationships with a high degree of accuracy

YOU will recall that the foundation of an I-30 watthour meter is formed by the main frame, a high-grade casting. The machining of this casting requires extreme precision in order to maintain accuracy of product and to make sure that each meter has the same wide-limit characteristics.

With this multiaction gauge, developed by G-E engineers, the inspector can determine whether the castings come within the exceedingly close tolerances necessary. In a single, simple operation he can do the work faster and more accurately than by the older, tedious hand method. In this way it is possible to machine frames by the thousand and still maintain an accurate check of all the dimensions.

This is but one of the many details that contribute to G-E meter progress. Milestones—such as the Types I, I-14, I-16, I-20, and I-30 meters—represent the major steps forward, but such detailed progress as is illustrated by this precision analyzer is continuous. Taken all together, they result in improvements in quality—and thus in performance—and often in economies to industry. General Electric Company, Schenectady, N. Y.

An Invitation

Would you like to visit our plant at West Lynn, Mass.? We extend a cordial invitation. It's an interesting trip; we think you will find it most profitable. Take a day or more if you can; but if you've only an hour, come just the same. Make arrangements through the nearest G-E sales office.

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HEADQUARTERS FOR ELECTRICAL MEASUREMENT

INDUSTRIAL ENGINEERING

Centralized Control for Sugar Refinery

Centralized control is a feature of the Pennsylvania Sugar Refining Company, Philadelphia, Pa., which uses d.c. for purposes of obtaining variable speed. Air circuit breakers are used throughout the plant, different types of installations being required in different sections.

One type of breaker installation is shown at left, a sub-distribution center, and one of the largest groups of breakers in the plant. Since they are located along the main aisle, the breakers are protected by a pipe rail. Included in the group of 230-volt breakers are six of 200 amp. serving various pumps; three of 150 amp.; one of 400 amp., serving scrubbers and smaller pumps; two of 400 amp. serving elevators and one of 400 amp. serving the motor for a CO_2 compressor.

A different type of cabinet is employed for the panel-mounted breakers in the crystalizing room (center). Each of the four 400-amp., 250-volt breakers serves a branch feeder for a group of motors. The back of the cabinet is accessible through a door in the side, for inspection of the feeders. Calibrations on the cabinet are for sweet water reservoir gauges nearby.

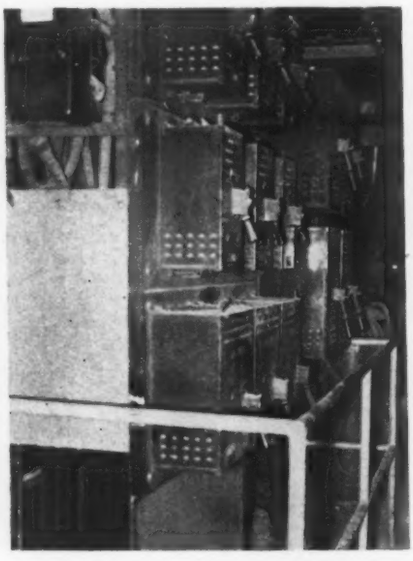
Additional protection is needed for circuit breakers in many parts of the plant, particularly in the centrifuging room (right), where dust and moisture are prevalent. Both live- and dead-front breakers are used, but in either case the breakers are inclosed in steel cabinets having glassed-in doors. The glass doors, of course, permit observation of the breakers from the aisle without opening the cabinet doors. In the line illustrated, the six cabinets each houses six circuit breakers.

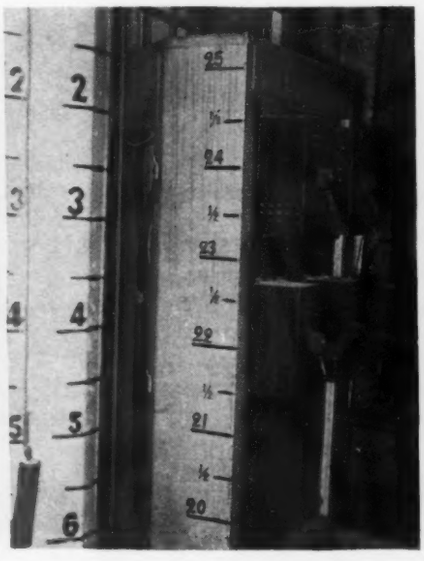
According to Herman Dost, chief electrician for the plant, this method of breaker installation has lowered maintenance cost and the steel cabinets—needed only where dust and moisture are a special problem—have added life to the breakers. He points out that such inclosure is economical for this plant where four or more breakers may be grouped at one point. Such grouping of breakers, in general, is an aid to maintenance and inspection.

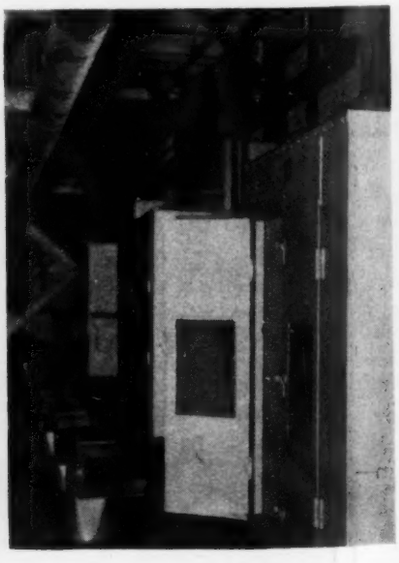
•

Quality Production Made Certain

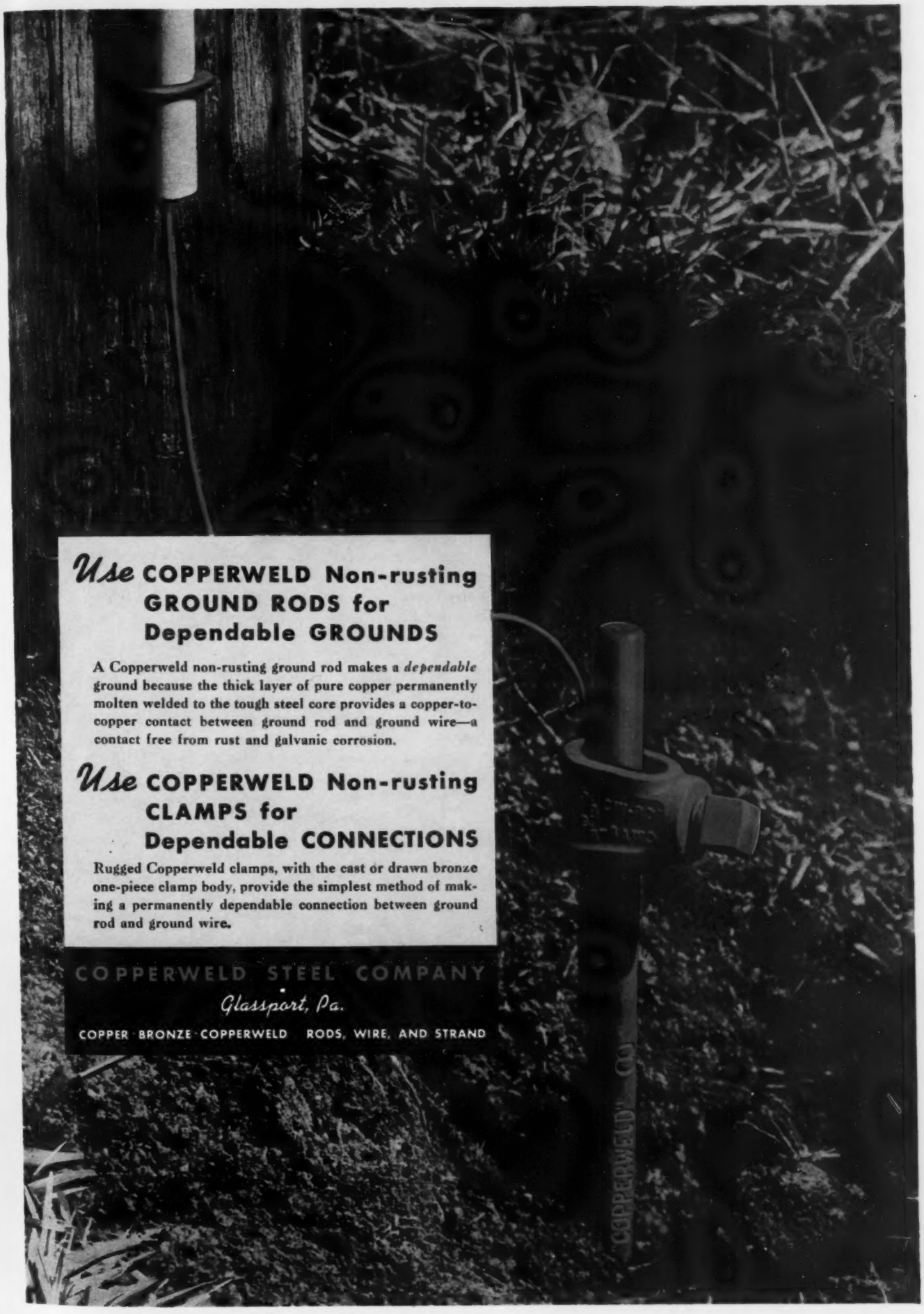
Electric furnaces superseded fuel-burning equipment at the Bennett Metal Treating Company's plant in Hartford, Conn., for the hardening of high-carbon, high-chrome steels and high-speed steels, largely on account of the insurance of quality production by the use of controlled atmos-







Sugar refinery requirements necessitate varied mountings for air circuit breakers


Use COPPERWELD Non-rusting GROUND RODS for Dependable GROUNDS
A Copperweld non-rusting ground rod makes a dependable ground because the thick layer of pure copper permanently molten welded to the tough steel core provides a copper-to-copper contact between ground rod and ground wire—a contact free from rust and galvanic corrosion.
Use COPPERWELD Non-rusting CLAMPS for Dependable CONNECTIONS
Rugged Copperweld clamps, with the cast or drawn bronze one-piece clamp body, provide the simplest method of making a permanently dependable connection between ground rod and ground wire.
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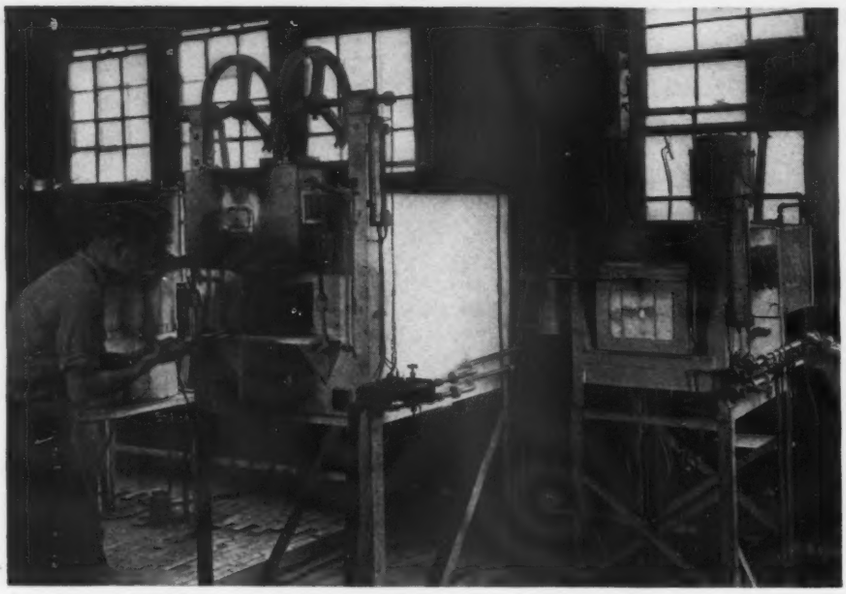


Preheating furnace at left; higher temperature unit at right

pheres in processing. The two furnaces illustrated are of C. I. Hayes manufacture (Providence, R. I.), the left-hand unit being rated at 15 kw. and the right-hand one at 12 to 15 kw. The left-hand unit has a working chamber 8x12x24 in. in size and is used for preheating high-speed steels, which are then transferred to the right-hand unit for completing the job.

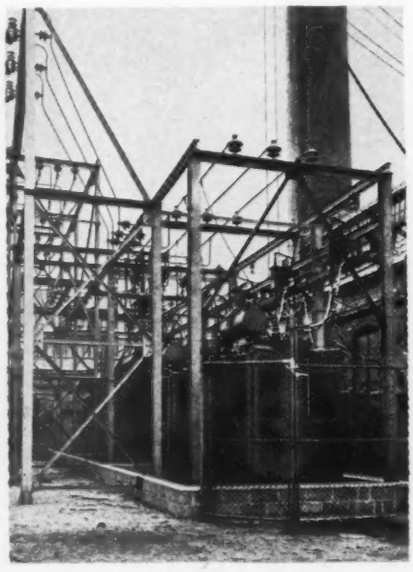
The time range in the former work is generally from fifteen to thirty minutes and in the smaller furnace from one to five minutes. The larger furnace is also employed for the complete operation of hardening high-carbon, high-chrome steels, this work usually taking from one to 1.5 hours. The smaller furnace has working chamber inside dimensions of 6x10x16 in.

Both furnaces have atmospheric control to eliminate scaling and preserve carbon content and both are controlled by potentiometers. The larger unit is used for temperatures ranging between 1,400 and 1,850 deg. F. and the smaller one at approximately 2,350 deg.

The close proximity of the two units is advantageous in saving production time during serial operation; the working conditions are also beneficial, and the accuracy of control conserves the carbon content of tool steels and minimizes rejects. In this plant electric service from the Hartford Electric Light Company system is also used for controlling the heating and cooling of brine and oil quench baths for tools.

Protect Plant Buildings Against Oil Fires

To confine inflammable transil oil to the substation area in the event of fire affecting one or more of the six main power transformers and thus protect adjacent plant buildings, Caterpillar Tractor Company, Peoria, Ill., has built a shallow tile "well" around each of the three 5,000-kva. transformer banks as shown. This well, 16 in. deep, 73 ft. long and 11 ft. wide, inside measure, is divided into three sections by two partitions. Each section, 16 in. x 24 ft. x 11 ft., is capable of holding all the oil from any one of the transformer banks. Flaming oil cannot pass from one portion of the well to the next, but is confined to the area of the bank where trouble started.



"Well" confines transformer oil to area of industrial substation

The nine 1,666-kva. transformers in this main installation are supplied at 13,200 volts by the Central Illinois Light Company and step voltage down to 4,000 volts wye for distribution throughout the 153-acre plant. Strategically located 4,000/440-volt power banks adjacent to load centers serve the various buildings. Average demand of the plant is 13,000 kva., total annual energy used about 5,350,000 kw.-hr.

Duplicate Facilities For Service Continuity

Continuity of service is so all-important to an oil refinery that Tidewater Associated Oil at Avon, Calif., takes no chances of an outage. So co-ordinated are the various stages of cracking and distilling crude oils to derive gasoline that a momentary shutdown of any of the auxiliary electrical equipment would not only be costly but in many cases dangerous. Another characteristic of oil-company operation is the continual desirability of making changes in order to use new equipment and new processes. Thus the entire electrical installation must be kept exceedingly flexible and subject to quick alterations.

Recently a number of new switching stations were installed at the Avon refinery by the Pacific Electric Motor Co. These stations embody the philosophy of N. A. DeLew, Associated Oil's electrical engineer, that a duplicate set of facilities should be maintained for every piece of equipment. In the switching houses all switches and contactors are duplicated. The floor is made of sections of heavy planking, each one loose and removable. This gives access to the feeder cables which are run on racks directly beneath the floor. Motor equipment near the stills is remotely controlled from push-button stations which operate through the automatic switching equipment. The cables are lead-covered and enter the switch houses from underground boxes branching out to racks on the sides of the building and feeding directly from the equipment above the floor. Duplication is carried right through to the transformer banks and services to individual buildings.

"ONE TEST IS WORTH A THOUSAND EXPERT OPINIONS"

—AND A THOUSAND TESTS

HAVE PROVED THE WORTH OF HUBBARD HEAVY DUTY, NO. 1378 SECONDARY RACKS. A TRIAL WILL CONVINCE YOU! . . . . .

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"HANG THE LOAD ON HUBBARD HARDWARE"

NEW ENGINEERING IDEAS

Stroboscopic Device Checks Small Motors

By U. J. RAPPEL
Professor of Electrical Engineering
University of Dayton
Dayton, Ohio

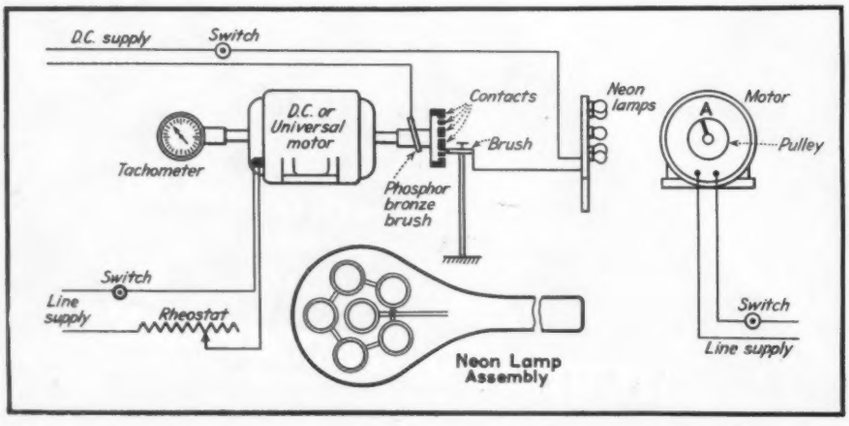
Simplicity of construction, ease of operation, accuracy, low initial cost, little and inexpensive maintenance mark this stroboscopic tachometer. The principal part of the tachometer is a contact disk, a brass casting keyed to the shaft of a small speed-controlled, d.c. or universal motor which also drives a direct-reading mechanical tachometer. A disk of insulating material—Bakelite, formica or fiber—is attached to the flat side of the casting by switch contacts set flush with the surface of the insulating material.

Contacts are evenly spaced in four concentric circles, with one in the innermost circle, two in the second, four in the third and eight in the fourth. A brush can be adjusted to touch the contacts in any of the circles; a phosphor bronze strip connected to a post and resting against the shaft of the contact disk acts as a common return.

Six 115-volt, three-watt neon lamps are fastened to a convenient handle; they are arranged at the corners of a pentagon, with one lamp in the center. A source of d.c. is connected to the phosphor bronze strip, through the contacts, brush, neon lamps and back to the supply. Thus whenever the brush rests on a contact the lamps light.

Suppose it is desired to measure the speed of a small motor ("A" in the test set-up pictured) which is somewhere around 4,000 r.p.m. The brush is set on the circle having the four contacts, a white mark is put on the motor pulley or shaft and is illuminated by the neon lamps. Speed of the motor driving the contact disk is adjusted until this white mark appears stationary. The tachometer reading, say 985 r.p.m., is multiplied by the number of contacts (4), giving the speed of the motor under test, 3,940 r.p.m.

Of course the white mark will appear to be stationary if the neon lamps light up every two or more whole revolutions of the motor. This may be checked in this manner: Choose the contact circle that appears about right. Adjust the speed of the disk motor until the white appears to be stationary at diametrically opposite points on the pulley or shaft. Then the flashes are twice as fast as the speed of the motor. Having thus determined the range of speed, the procedure outlined above may be followed.



Schematic set-up for testing speed of small motor with new stroboscopic tachometer

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Improved Insulation With New Material—I*

By S. L. BROUS
B. F. Goodrich Company, Akron, Ohio

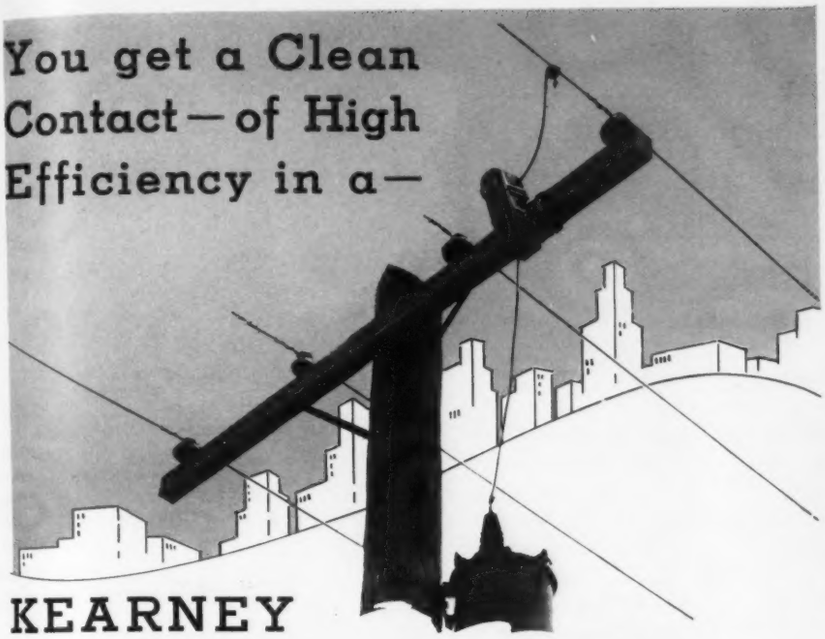
Chemists working with limestone, coke and salt have developed a new insulation material for the wire and cable industry.

"Koroseal"[1] is a generic term embracing a series of synthetic elastic compositions[2, 3] having many of the desirable characteristics of rubber but without many of its disadvantages, and with properties varying from those of hard rubber to those of a very soft gel. In all of the compositions the material is a plasticized special polymer of vinyl chloride. By adaptations of composition and of methods of processing, a variety of useful materials has been produced, the physical, chemical and electrical properties of which may be varied over a wide range by compounding, particularly by the choice of plasticizer.

Possessing a combination of physical and electrical characteristics,

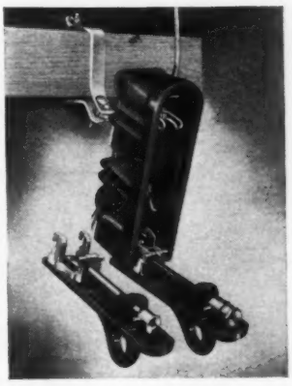
* This is the first of two articles describing the properties and application of "Koroseal."
[1] Trademark, registered, U. S. Patent Office.
[2] Brous & Semon, *Ind. Eng. Chem.* 27, 667 (1935).
[3] Fritz & Brous, *India Rubber World*, 97, No. 6, pp. 41 (1938).
[4] For complete list of corrosives see *Chem. & Met. Eng.* 43, 560 (1936).

You get a Clean Contact—of High Efficiency in a—



KEARNEY TRIPOMATIC FUSE CUTOUT

OPERATING men have found that point pressure contacts in Kearney Tripomatics are a most important construction feature that assures proper and dependable operation of the cutout and eliminates a lot of costly trouble . . . Because every time you reclose a Kearney Tripomatic, after it has cleared a fault and protected your equipment, you wipe back a clean, bright contact surface.



Note special door used to convert Tripomatics into solid blade disconnects.

Overcomes Troubles

Thus, you won't be troubled with corrosion, excessive heating, poor conductivity or other known cutout ailments so often caused by less efficient contacts.

Many operating men will tell you about other fundamental design features of Kearney Tripomatics that assure long life and trouble-free performance—for instance, positive trip out action of the door, made possible by its special hinge construction; corrosive-resistant metal parts; sturdy, well-designed doors, porcelain housings, and other such refinements.

Lower Costs

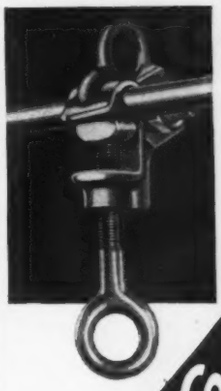
You'll be interested to know that some operators standardize on Tripomatics because of lower operating and maintenance costs . . . They reason this way: clean contacts mean better conductivity, less maintenance trouble, more positive performance and thus—greater protection to equipment—all of which effects higher efficiency at lower costs.

If you agree that cost considerations should include these features of performance and maintenance — you, too, will want to specify Kearney Tripomatics on your next order to verify the experiences of scores of companies, large and small, from coast to coast . . . Ask a Kearney Representative about Kearney Tripomatics—or write direct.

For further information about the Kearney line of Tripomatics consult Bulletin 312—or write direct for details and latest prices and discounts.

Quick Taps With Con-Nec-Tap Clamps

TAP TRANSFORMERS to the line, as shown at left, tap lightning arresters, too . . . quickly and conveniently with these small, rugged Kearney Con-Nec-Tap Clamps, specially constructed to give straight line pressure from the screw to the line conductor . . . Take advantage of this FREE trial offer which permits you to test these clamps as you see fit. Send in the attached coupon today.



Clamp shown makes Connections to 7.5/12.5 V; 50 ampere Tripomatic.

for Better Connections

Kearney now produces more than 75 standard Con-Nec-Tites

You Owe Yourself This FREE-Proof Test

SOLDERLESS wire connectors may look quite alike . . . But, put them to test and you'll see vast differences—in conductivity, in "between conductor pressures"—in uniformity and in brute strength . . . You owe it to yourself—to the safety and efficiency of your lines—to test out a FREE sample Kearney Con-Nec-Tite. Mail the coupon—now.

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4224 Clayton Avenue, St. Louis, Mo.

Please send FREE Sample as checked.

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JAMES R. KEARNEY CORPORATION

4224-42 CLAYTON AVE. ST. LOUIS, MO.

Table I—Physical Characteristics of Three Typical Koroseal Compounds Used in Cable Industry

(All physical measurements made at 30°C.)

Compound	A	B	C
No Aging			
Hardness—Shore type A Durometer	80	80	82
Ultimate tensile strength (Lb. per sq. in.)	2350	2420	2400
Ultimate elongation (per cent)	250	300	225
Aged 2 weeks in Bierer Bomb (300 lb. per sq. in oxygen at 70°C.)			
Hardness	86	89	80
Ultimate tensile strength	2440	2470	2330
Ultimate elongation	220	280	200
Aged 2 months in Geer oven (Circulating air at 70°C.)			
Hardness	83	93	81
Ultimate tensile strength	2500	2520	2210
Ultimate elongation	265	140	215

Table II — Electrical Characteristics of Same Three Koroseal Compounds as Shown in Table I

Compound		A	B	C
Resistivity—(Ohms per cm.³)	at 25°C	—	4×10^{14}	1.8×10^{13}
	45°C	—	5.4×10^{12}	4.7×10^{10}
	70°C	65×10^{9}	7.8×10^{10}	2.5×10^{9}
60-Cycle Measurements				
Power factor	at 25°C	—	11.7	14.8
	45°C	—	10.5	16.1
	70°C	4.8	8.8	79.4
Dielectric constant	at 25°C	—	4.1	6.8
	45°C	—	6.8	9.8
	70°C	13.8	8.0	10.7
1,000-Cycle Measurements				
Power factor	at 25°C	—	7.9	15.5
	45°C	—	15.6	13.0
	70°C	4.1	5.2	14.1
Dielectric constant	at 25°C	—	3.4	5.1
	45°C	—	5.3	8.3
	70°C	13.0	7.6	10.0

Koroseal is suited to many applications as an insulating or sheathing material. Koroseal has high dielectric strength, complete resistance to corona cutting, good insulation resistance and is capable of being compounded to provide low power factors and dielectric constants (Table II). It has good moisture resistance, as well as resistance to acids, alkalies[4] and light. It does not swell in oil or common hydrocarbon solvents.

Of primary importance is its resistance to flame propagation. Koroseal has properties which permit of the pulling into conduits without rupture under normal handling. Resistance to heat is such that Underwriters' Laboratories have approved the material in certain applications for continuous operation at 80 deg. C.

Of additional importance is the fact that the insulation resistance and dielectric strength remain stable during continuous immersion in water. Further, actual exposures to the elements for a period of three years have produced no appreciable change in the electrical or physical properties.

•

Pipe Line Corrosion Damage Prevented

An improved method of protecting underground pipe line systems conveying gas, oil and water by making it easier to arrest corrosion damage has been developed by Dr. Scott Ewing, American Gas Association research associate at the National Bureau of Standards.

A patent covering the development is being applied for and the American Gas Association has arranged to have it dedicated to the free use of all American industry, municipal water works systems and the government.

Millions of dollars are lost annually through corrosion of underground pipe lines. One of the principal causes of this corrosion is the presence of stray electric currents in the soil. "Cathodic protection" guards against the effects of these stray currents by setting up opposing potentials. To do this successfully it is necessary to measure potentials which cause the stray currents in the soil. This is done by means of an electrode driven into the ground and a standard cell.

The cells which have been used for this purpose have introduced considerable errors, owing to the differences between individual cells, to polarization and to the effect of temperature variations.

During the past six months, Dr. Ewing has been investigating the characteristics of these cells. He has developed improved half-cells of both the cadmium-cadmium sulphate and copper-copper sulphate types for measuring the earth potentials. Either type can be constructed without difficulty and will satisfy the requirements of field measurement.

There are no marked advantages for either cell. The potential to be measured is smaller with the use of the cadmium cell, but if any serious difficulties arise, when using either type, it will probably be caused by liquid junction potentials between the half-cell solutions and the soil. Polarization can be taken care of readily and corrections can be made for temperatures. The new cells were described by Dr. Ewing at the American Gas Association meeting in Chicago, April 18.

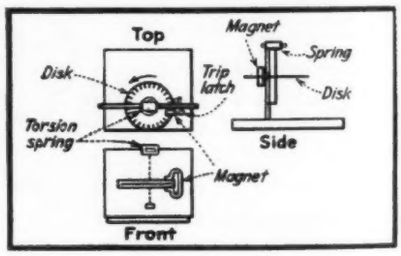
Measure Meter Magnet Strength

A simple but ingenious device has been developed in the meter department of the Central Illinois Public Service Company, Springfield, for actually measuring, in arbitrary units, the strength of watt-hour meter permanent magnets.

Before this device was developed magnets were tested on a meter of known torque. Difficulty was experienced in maintaining such a meter. The accuracy of the new device is maintained by checking the spring with a weight which makes possible the reproduction of the entire device without setting up a new system of units.

Tester set-up

The tester consists of a moving element built up with a disk and bearings taken from a discarded GE type M-4 demand meter. Force is imparted to the disk by a Westinghouse type U voltmeter spring through a lever system with stops. When released, the lever strikes a pin set in the periphery of the disk, which then rotates according to the magnitude of the force imparted to it. The magnets to be tested are held in place around the disk by spring clips, which differ according to the type, make and size of magnets, thus making screw clamps unnecessary. With the magnet to be tested in place, the lever is released by a push button. The distance the disk rotates is a measure of the magnet strength. In the case of the tester used at Springfield the disk has 120 uniform scale divisions.



Ingenious tester measures meter magnet strength

To "calibrate" the tester when it was first made readings of disk rotation were taken for a number of new magnets of different types and makes. The average of these readings for each magnet type was used in establishing the arbitrary units of strength.

LATOX CABLES *Increase* CONDUIT CAPACITY

This is the termination of a typical Simplex-LATOX fire alarm cable installation. In the four cables coming up through the floor are 120 conductors. Notice how slender these cables are. They are not big and bulky and yet they carry the circuits from all the fire alarm signal boxes in a large eastern city.

If you have conduits that are filled with the older type cables you can get a greater number of circuits into your conduits by replacing the old cables with Simplex-LATOX cables. When you use Simplex-LATOX cables you can use every allowable bit of space in your conduits. There is no waste space with LATOX insulated cables. LATOX cables because of their small outside diameters will give you the additional circuits you desire and at the same time will allow you to use existing ducts.

LATOX cables can be smaller and still be dependable because the rubber wall of insulation on each conductor is all insulation. Simplex-LATOX insulation was designed to reduce weight and bulk and at the same time improve those physical and electrical properties necessary for efficient conductor insulation. In short, it was developed in Simplex laboratories to meet a definite need caused by the conditions under which you work today.

The advantages of lighter weight and smaller diameter are combined with the higher electrical and physical properties that LATOX insulation provides to give ideal performance for communication, signal and control cables.

Simplex Wire & Cable Company, 79 Sidney Street, Cambridge, Mass.

Simplex – LATOX

Thin insulation made directly from rubber latex

LOAD BUILDING

Electric Cooking Nets 0.42 Cent a Meal

By S. S. SANSBURY
Sales Engineer
Union Electric Company of Missouri,
St. Louis

At Monticello College, a girl's school near Alton, Ill., having an average student body of 174 and a staff of 71, installation of an electric kitchen and bakery is saving $790 a school year in food costs alone. This represents 0.42 cent per meal for the 185,600 meals served yearly.

The electric kitchen and bakery were installed at the beginning of the 1937-38 school year. For the previous term the total cost for electricity amounted to $3,881.01. With the electrical equipment the electricity cost amounted to $4,142.79, an increase of $261.78.

According to the school dietitian, "the saving in operating cost is only a small part of the large savings that have resulted to the institution by the use of electric cooking. Whereas we formerly had to buy 60 pounds of roast to serve 202 students and faculty, we now purchase only 45 pounds of meat to serve the same number of meals. During the school term of 1937-38 this has resulted in a saving to the institution of approximately $790. In addition to the savings in meat shrinkage, we have also been able to effect tremendous economy due to our use of automatic electric deep fat fry kettles. With these kettles we are doing far more deep fat frying than we were formerly able to do, which has resulted in lowering the cost per meal and at the same time increasing the attractiveness and variety of our menus. Based on the same amount of deep fat frying as we formerly did on top of our ranges, we estimate that we are saving from 40 to 50 per cent of the frying agent.

"Over and above all the economies resulting to us from the installation of electric cooking, I, as a dietitian, consider the greater value of electric cooking to be the fact that better flavored and more healthful foods result, due to the retaining in the foods themselves more of the food values and vitamins than was formerly possible."

During the first school year that the institution had the equipment use amounted to 153,191 kw.-hr., or an increase of 65,071 kw.-hr. over the consumption of the previous year of 88,120 kw.-hr. This increased use included a new dormitory as well as the electric equipment. However, assuming the total increase to be due to the electric kitchen and bakery, careful analysis discloses the following:

Meals prepared	185,600
Energy per meal, watt-hours	350
Food cost saving (based on meat alone)	$790
Net saving per meal, cent	0.42

•

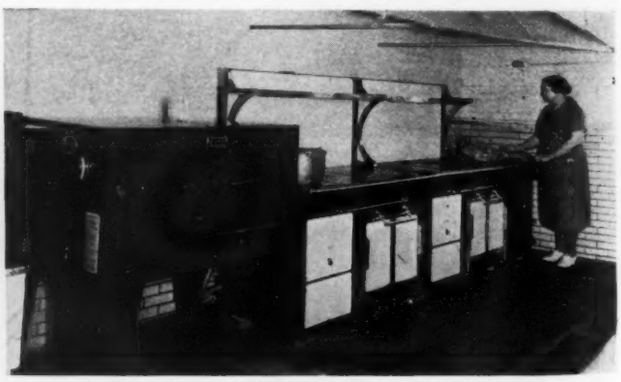
San Diego Issues 20 Certificates

By G. H. P. DELLMANN
Engineer in Charge of Lighting Sales,
San Diego Consolidated Gas & Electric
Company, San Diego, Calif.

We have promoted adequate wiring since the first of April last year on the basis of our Pacific Coast electrical bureau's Red Seal plan and its modification.

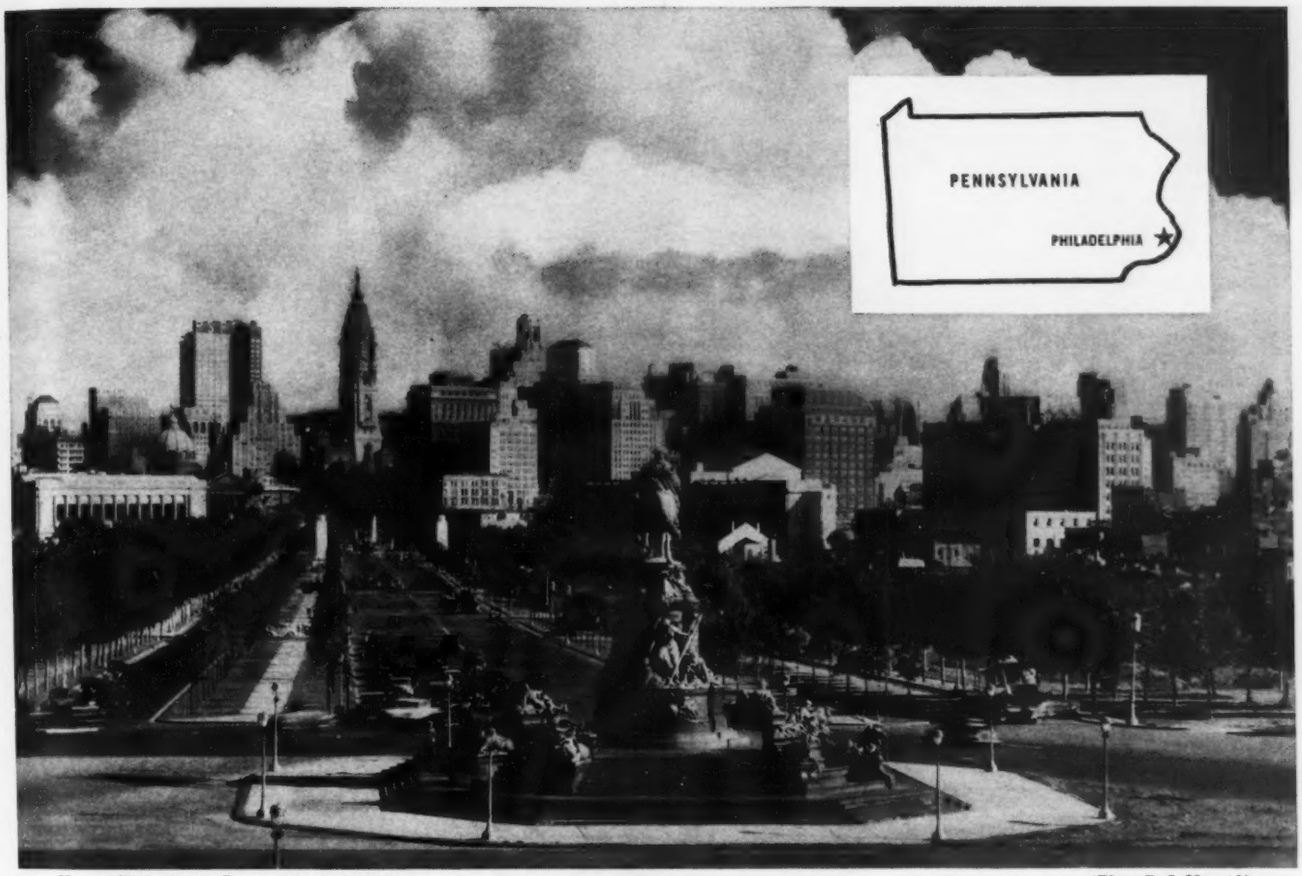
As a result, we had 34 Red Seal applications and 20 of these were finally issued certificates. The fourteen others were either rejected or we were not notified in time to make our inspection.

During this time we worked on 161 plans and in all cases were able to make a considerable improvement in the wiring that had been contem-



Girls' school saves $790 on food cost alone with electric cooking. Kitchen and bakery at Monticello College

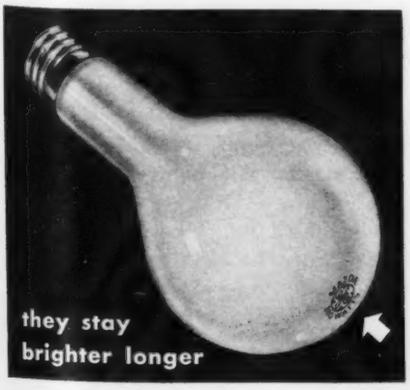
Selling lamps and lighting in PHILADELPHIA, PA.



View of Philadelphia, Pa., population 1,950,000 *(Photo-R. I. Nesmith)*

HERE'S a quick summary of the way that General Electric advertising is constantly at work in Philadelphia, promoting light-conditioning for Better Light-Better Sight. Into Philadelphia homes every week goes a steady stream of G-E lamp and lighting advertisements amounting to 40 impressions per person in the last ten years.

IN 1939 . . . 4,650,000 magazines with G-E lamp advertisements and 2,022,780 radio messages.



SINCE 1929 . . . 49,060,000 magazines with G-E lamp advertisements.

FALL 1938 . . . 7,839,000 copies of Philadelphia newspapers with G-E lamp advertisements.

LAST 3 YEARS . . 22,800,000 newspapers with G-E lamp advertisements.

SINCE 1929 . . . 79,951,120 advertisements in magazines newspapers and radio. Which is approximately 40 advertisements per capita.

GENERAL ELECTRIC

MAZDA LAMPS

IN YOUR CITY. You can easily estimate the approximate number of lamp and lighting advertisements General Electric is delivering to your customers by applying the following national averages:

Going into the average wired home in 1939

14 magazines with G-E lamp ads
5 newspapers with G-E lamp ads
5 radio messages
24 total advertising messages

. . .

In the last 10 years, the average wired home received

158 magazines with G-E lamp ads
30 newspapers with G-E lamp ads
20 radio messages
208 total advertising messages

plated by the owners. It is our belief that this work has been worth while and it will be continued.

•

Display Contest Boosts Lamp Sales

By sticking to brief, simple rules and using home-service representatives to stimulate enthusiasm, Puget Sound Power & Light Company succeeded in gaining enthusiastic dealer support with a highly successful window display contest. A required part of each contest window was a placard bearing the message: "Read with Comfort, Save your Eyes, with I.E.S. Lamps."

On the basis of total sales for I.E.S. lamp drives in the last three months of 1936 and 1937, a 14,000-lamp quota was established for this season. Attributed largely to the contest is the fact that dealers sold 20,364 lamps in the three-month period, or 145.5 per cent of quota.

This represented a sales volume of $225,000, assuming retail selling price to average $11 per lamp.

To stimulate interest in the contest, the company offered cash prizes totaling $420. Prizes of $20, $15 and $10 were competed for in each of the company's six operating divisions. Winners in the division were in turn judged for grand prizes of $75, $50 and $25. In addition to the rule requiring inclusion of the placard, the only other step necessary for the dealer to enter the contest was to carry on his display for at least one week during October and to submit photographs of his window before November 7.

Windows in each division were judged by an impartial committee of three persons, not more than one of whom was an employee of the company. A special board not directly related to the industry selected the grand prize winner.

Each home-service representative in the division which made the highest per cent of quota was awarded $10, those in the second $7.50 each, those in the third $5 each. Lamp jobbers and distributors co-operated by maintaining dealers' stocks, expediting lamp supplies, aiding with floor and window showings, etc.

Co-operation of all these branches was a real help to the dealers and proved a big factor in so successfully pushing lamp sales over quotas.

Electric Fryer Saves Bakery Material

Replacing a gas-heated outfit, a Wells electric doughnut fryer has recently been installed at the Nathan Baggish Bakery, Inc., Hartford, Conn., with excellent operating results, which indicate that the savings achieved will pay for the complete job inside of fifteen to eighteen months. The kettle, 24 in. in diameter, is rated at 7.5 kw. and has a capacity of about 100 doz. doughnuts per hour. The total cost of the installation, including special wiring, was in the vicinity of $120, and service is provided by the Hartford Electric Light Company.

Doughnut kettle improves production
Seven and one-half kw. fryer on lines of Hartford Electric Light Company uses 116.5 watt-hours per dozen doughnuts.

The fryer saves from 40 to 50 per cent of the fats, not only because properly controlled temperatures (automatic thermostat is used) prevent burning of fats, but because providing the right temperatures means less absorption of fat into the doughnuts, crullers, etc., cooked. In this unit the electric heating elements are immersed in the fat itself above the bottom of the vat, leaving a low-temperature zone at the bottom where the sediment collects. This prevents burning of particles which might cause specking of doughnuts and so reduce their sales appeal. There is also a notable reduction in fire hazard, since spattered grease cannot ignite. As there is no flame to exhaust the air supply or cause fumes, special ventilation arrangements are not required. This increases the flexibility of the equipment and saves space. The kettle capacity is 2 lb. of fat.

A test on a similar installation with minor differences gave an energy consumption of 116.5 watt-hours per dozen doughnuts. In that case 4 kw.-hr. was required in 38 minutes preheating and 10 kw.-hr. in 130 minutes of frying 120 doz. doughnuts in 130 minutes. In that case 28.5 lb. of fat was consumed in gas cooking, against 18.5 lb. with electric frying.

•

Spotlight Activity Nets $1,200 of E.A.R.

A special sales campaign on spotlights for commercial establishments using the new 150-watt reflector lamp was conducted by Central Illinois Public Service Company, Springfield, Ill., during January and February, and brought the company an E.A.R. of $1,200 for the new load.

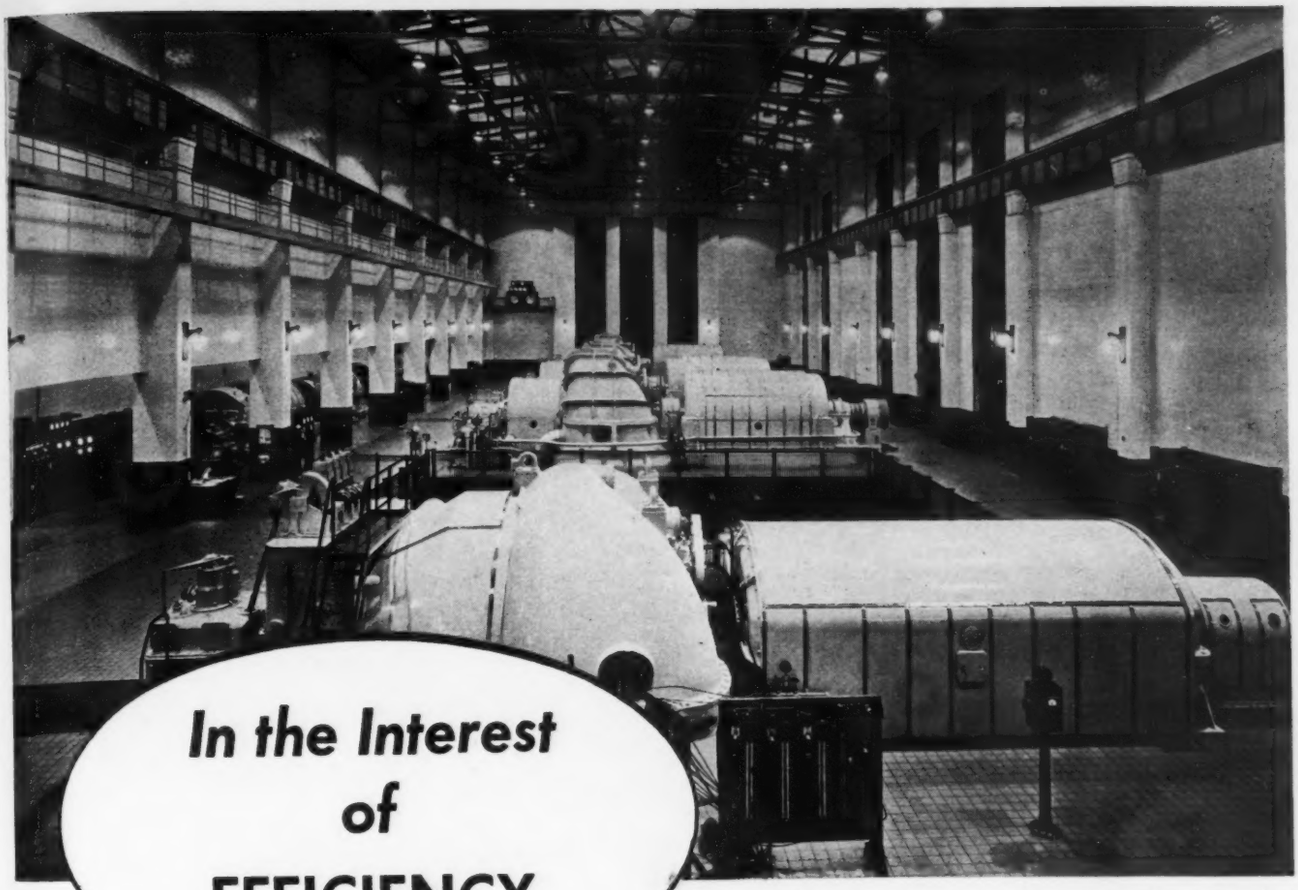
This was the first active campaign on the newly introduced reflector lamps in the company territory and as a result sales were brisk. A total of 144 spotlights were sold and in all but one of the divisions sales quotas were exceeded.

Complete Units Only

The spotlights, consisting of reflector lamps and portable spotlight bases, manufactured by the Mitchell Manufacturing Company of Chicago, were sold only as a complete unit. This policy insured a new active outlet and added load with each sale. Reflector lamps sold for use in existing sockets were not counted in the campaign, as in most cases such a sale represented merely the replacement of one lamp with another.

During the campaign good results were obtained from spotlights left on demonstration for a few days. When properly installed, the spotlights produced results which were so satisfactory that few merchants failed to buy.

Sales were made in clothing stores, variety stores, flower shops, bakeries, garages, drug stores, hardware stores, millinery shops and other places. The wide variety of installations indicates the broad appeal of this unit.



In the Interest of EFFICIENCY

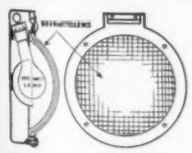
The above photograph of the Delray P. H. No. 3 shows the uniform, glareless lighting results obtained through use of the Holophane HIBAY reflectors No. 690-AL (Installation design by the Engineering Department of the Detroit Edison Co.)

THROUGH the use of Holophane specialized lighting equipment, utilities are obtaining a greater utilization of light—controlled and directed to specific areas or locations.

Scientific light distributions, patterned to fit every important location in generating and substations, have been made possible through the cooperation of utility engineers with Holophane. And, for this reason, Holophane lighting equipment is preferred by leading utilities for lighting their own properties.

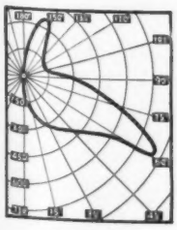
A free copy of "Lighting Specifics for Generating and Substations" is yours for the asking. Mail the coupon below.

A NEW HOLOPHANE SPECIFIC FOR LIGHTING BOILER ROOMS

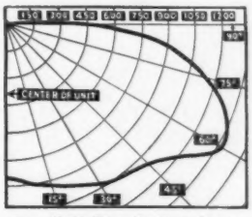


Sectional View *Plan View of Front*

Illustrated, No. U-818 is a cast aluminum dust-tight 200-watt unit having a wide spread of *lateral* light distribution and an angular vertical distribution. (See charts) It is especially well adapted for many boiler room locations and for wall alleys in substations. This unit is one of many new 1939 Holophane specifics producing increased illumination efficiency in utility company plants.



Distribution across Floor



One Half Distribution Along Floor Through Angle of Maximum Candle Power

A Few Leading Utilities Using Holophane Specifics

CONNECTICUT LIGHT & POWER COMPANY
CONSOLIDATED GAS, ELEC. LT. & PR. CO., *Balt.*
CINCINNATI GAS & ELECTRIC
DETROIT EDISON CO.
HARTFORD ELECTRIC LIGHT CO.
BUFFALO NIAGARA ELECTRIC CO., *Buffalo, N. Y.*
PACIFIC GAS & ELECTRIC, *San Francisco*
POTOMAC ELECTRIC POW. CO., *Washington, D. C.*
PUBLIC SERVICE CORPORATION *of New Jersey*
WEST PENN POWER CO.

HOLOPHANE

Engineering Service

342 Madison Avenue New York, N. Y.

Holophane Co., Ltd., 385 Yonge St., Toronto, Canada

FREE: Send for Your Copy

Holophane Co.
342 Madison Ave., New York, N. Y.

Gentlemen: Please send me, free, the 1939 data sheet portfolio entitled "Lighting Specifics for Generating and Substations," containing complete lighting specifics for all important locations in utility power plants.

Name .....

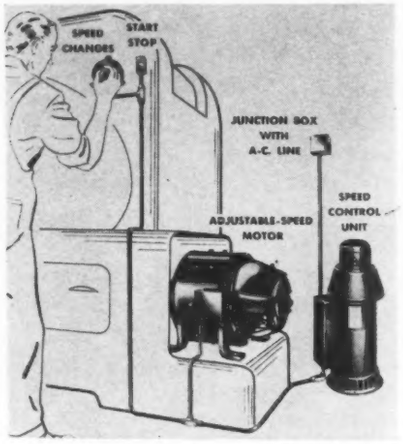
Address .....

Firm .....

NEW EQUIPMENT

Adjustable-Speed Drive

Machinery designers and users should find a useful tool in this new variable-speed drive, which features compactness and ease of installation. Three wires from the a.c. source—220, 440 or 550 volts, three-phase—are connected to the vertical control unit. From this unit, secondary circuits are run to the driving motor—which may be one of a variety of types—to a speed adjuster and to start and stop buttons, both of which devices may be remotely located from the control unit, within easy reach of the operator. A "packaged" control set combining conversion and starting units for a 7½-hp. motor can be put in a floor space 18 in. square.



Type "V-S" adjustable-speed drive; for varying speeds of one- to 15-hp. motors over as much as a 16 to 1 range. **Reliance Electric & Engineering Co.**, Cleveland, Ohio.

•

Polyphase Contactors

1,200- and 600-amp. contactors. **Monitor Controller Co.**, Baltimore, Md.

Complete quenching in from one-half to one and one-half cycles of arcing time and minimized contact resistance are claimed for these new contactors. Side plates of magnetic blowouts are turned toward each other to diminish air gap and concentrate flux. Lower contact makes after and breaks before upper contact. Both blowout core and side plates are laminated to keep magnetic field in phase with current in arc path and to eliminate "blow-down" or "no-blow" effects. Motion of vertical plunger solenoid, the actuating mechanism, is transferred to contact shaft through toggle system designed to provide maximum speed in contact opening and maximum pressure when contacts are closed.

•

Wireholder

"99" wireholders; average ultimate strength of 2,500 lb., hole size, 1 1/16 in.; "88," ultimate strength of 1,600 lb., hole size, 13/16 in. **Porcelain Products, Inc.**, Parkersburg, West Va.

Thirty per cent greater holding power is claimed for a new wireholder because of its specially designed screw with threads of twice ordinary depth and greater root area. High-density porcelain is said to provide greater ultimate strength; around the alloy assembly in the base is a heavy, water-proof gum to protect both the wood around the screw and the assembly itself against the weather. As the wireholder is screwed into place this gum is forced along the thread into the wood and also spreads in a thin layer between the wood surface and wireholder base.

•

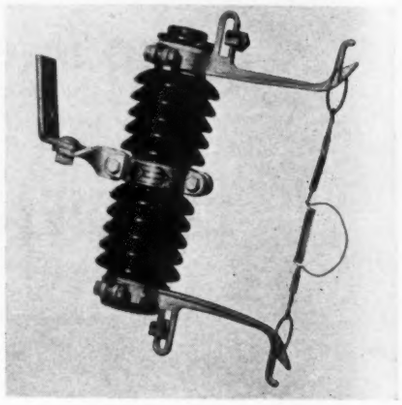
Subway Oil Switch

The self-aligning links on this subway oil switch exert 150 lb. pressure at the ball and groove contacts, designed to eliminate arcing tips. Slight pitting occurring in breaking full load is said not to damage the contacts; according to the manufacturer, tests show less heating after a series of full load interruptions on sustained full voltage.

Type "PK" 7.5-kv., 400-amp. subway oil switch; in single-throw models and double-throw combinations for two, three and four conductors. **G & W Electric Specialty Co.**, Chicago, Ill.

Rural Distribution Cutout

Contact arms of these "tubeless" rural distribution cutouts have no moving arms; rings of the extendable-spring fuse links are seated in the upper and lower contact seats, using a standard ball-point hotstick.



"Dropoff" cutouts; ratings, 25 amp. 7.5/12.5 kv. Y to ground and 15 kv.; for pole or crossarm mounting. **W. N. Matthews Corp.**, St. Louis, Mo.

When the fuse link melts, the stainless steel spring contacts and both upper and lower ring contacts drop off their respective contact seats. Thus, nothing is left dangling which needs to be removed before refusing.

•

Electric Hoist

"Quik-Lift" electric hoist; with load hook or trolley suspension, in capacities from 250 to 4,000 lb.; weight, from 89 to 195 lb.; operates on 110, 220, 440 volts, single or three phase, 60 cycles or d.c. **Coffing Hoist Co.**, Danville, Ill.

New light-weight electric hoist may be plugged into an a.c. or d.c. outlet, is powered with a heavy-duty ball-bearing motor, fully inclosed and with a high starting torque. Shoe-type brake is used and hoist is equipped with limit switches and pendant control.

•

Electronic Switch

This electronic switch has been developed to end sticking and arcing contacts on such equipment as thermostat regulators, small limit switches or any type of equipment requiring very low contact pressure. It will operate with contact resistances up to 500,000 ohms, with current-carrying capacity of 10 micro-amp. Switch

Pub. R.-L. Dupuy - Paris

EXTINGUISHING AN ARC OF 1,000,000 kVA *without oil!*

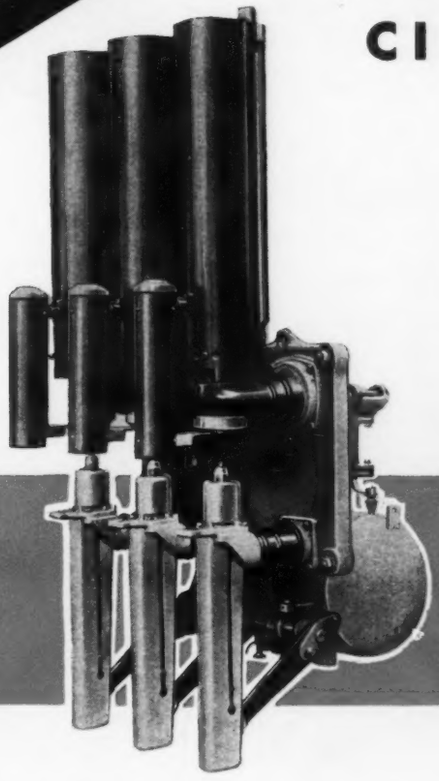
"PNEUMATIC" TYPE AIR-BLAST CIRCUIT-BREAKERS

A "PNEUMATIC" type CIRCUIT-BREAKER is exhibited in the **FRENCH BUILDING** at the **NEW YORK WORLD'S FAIR.**

The salient features are as follows:

- **RESISTOR** inserted by the arc
- **AUTOMATIC COMMUTATION** of the arc
- **AUXILIARY ELECTRODE**

Upon request, literature will be forwarded.



ATELIERS DE CONSTRUCTIONS ÉLECTRIQUES DE

DELLE

Villeurbanne-LYONS • (Rhône) • FRANCE

WE'RE LOOKING FOR THE
ROAD TO REVENUE

THE FACE OF EVERY TOP UTILITY EXECUTIVE FITS THIS PICTURE, SO...*

*You'll FIND that EXTRA REVENUE you're looking for by lining up with the big national advertising and promotional drive on

ELECTRIC ROASTERS

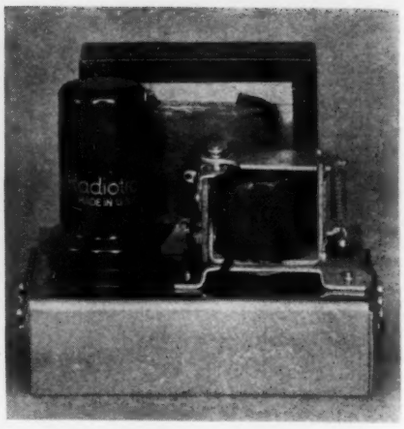
because electric roasters

1. Move low use customers over onto the PROFIT side.
2. Use current at HIGH blocks in rate structure.
3. Rank FOURTH as load-builders among home appliances.
4. Require NOT ONE CENT of added capital investment for utility.
5. Already rank FIFTH among appliances retailing for $20 or more.

THREE YEAR ELECTRIC ROA$TER

advertising drive sponsored by
EVERHOT • GENERAL ELECTRIC • NESCO • PROCTOR • WESTINGHOUSE

WRITE NOW FOR ELECTRIC ROASTER PLAN BOOK
THE MODERN KITCHEN BUREAU
420 Lexington Ave...New York, N. Y.



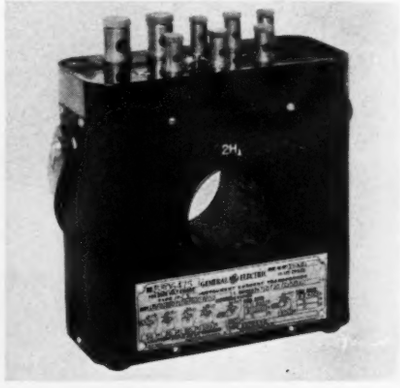
Electronic switch; power output, 3 watts at 110 volts, 50-60 cycles; uses one type "6 J 5" tube, takes an s.p.d.t. relay for non-inductive load. **United Cinephone Corp.**, Long Island City, N. Y.

can also be used to control chemical solutions or any high-or-low resistance substance it is desired to regulate electrically, it is said, and may be operated in any position and in temperatures up to 1,500 deg. F.

•

Current Transformer

Compactness is a feature of a new lightweight, multi-range current transformer, designed for field testing with portable



Type "JP-I" portable instrument current transformer, 25/125 cycles, for 2,500-volt circuit, 10, 20, 50, 100 to 5 amp. (self-contained) and 150, 200, 300, 400, 600, 800 to 5 amp. using cable turns for primary. **General Electric Co.**, Schenectady, N. Y.

instruments. A combination of wound-primary and through-primary construction, plus a tap in the secondary, are used to obtain additional ratios.

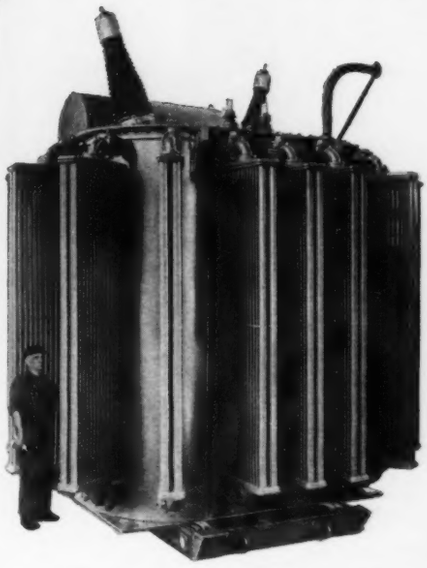
•

Power Tap Switch

Model "412" tap switch; 40-amp. rating for 240 volts non-inductive a.c.; 4 in. in diameter; equipped with maximum of 12 contacts. **Ohmite Mfg. Co.**, Chicago, Ill.

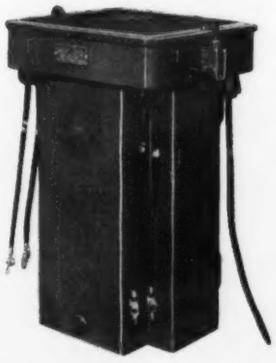
Compactness is a feature of this new series of high-amperage, heavy-duty, rotary multi-point selector tap switches. Offered for use with tapped transformers, battery chargers, arc welders, motor controls, the switches are inclosed, all-porcelain, and have silver-to-silver contact with all other current-carrying parts silver-plated. Porcelain high-voltage insulation is provided between contacts and shaft and mounting plate. They are designed for single or tandem back-of-panel mounting.

DEPENDABLE



Type CC Power Transformers (Sizes from 501 to 10,000 Kva.)

→ *Air-Cooled Transformers (Sizes up to 150 Kva.)*



Type RS Distribution Transformers (Sizes up to 100 Kva.) ↑

→ *Type C Distribution Transformers (Sizes from 101 to 500 Kva.)*

in all ratings; for all requirements

For more than 38 years many of this country's largest electric utilities and leading industrials have selected AmerTran Products. Transformers furnished have included not only all standard ratings* but also special units for almost every conceivable application, including testing, furnace, welding, instrument, precipitation, plate and filament types. All sizes and types are characterized by careful design, good workmanship, rugged construction, attractive appearance and attention to details. Dependability is proven by years of successful service. Let us submit data on transformers for your needs.

*10,000 Kva. and smaller at 132 Kv. and below.

AMERTRAN

AMERTRAN TRANSFORMERS

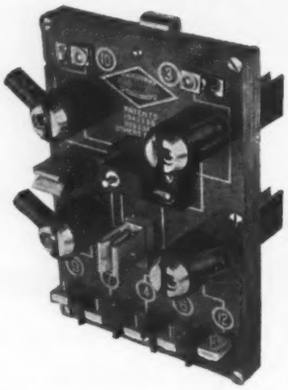
AMERICAN TRANSFORMER COMPANY

178 Emmet St., Newark, N. J.

Manufactured Since 1901 at Newark, N. J.

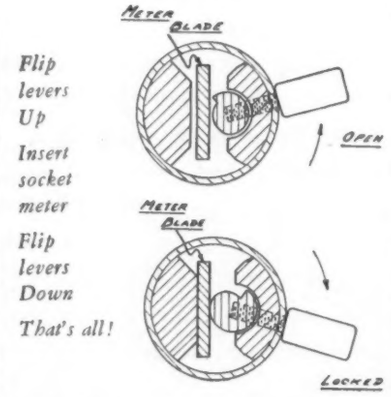
STATES TESTING EQUIPMENT

A New
TEST JACK
You'll find Interesting



for 2-3 wire self-contained single phase and net work polyphase meter testing

See how easy it is to operate—



1. Lever-actuated cams aid quick and easy operation.
2. Laminated base gives strength and long life.
3. Adjustable potential tap gives added protection.
4. Diagram of internal connection on face and back of base.
5. Steel reinforced test terminals.
6. All buss light weight aluminum.

Full details gladly sent. Write.

THE STATES COMPANY 3 New Park Ave. Hartford, Conn.

Electric Gate Operator

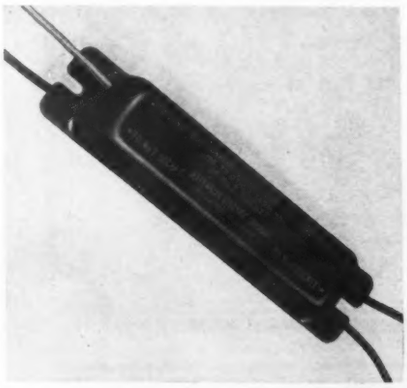
Designed to operate single-leaf swinging gates, this device includes a latch which automatically locks the gate when closed and features a heliocentric speed reducer, of the type used on canal gate operators. A limit switch shuts off the motor when the gate is fully opened or closed and the adjustable friction clutch will slip if the normal driving load is exceeded abnormally. One model of operator requires constant contact at the control station while a second type is equipped with a relay and requires only momentary contact. This latter type may be controlled from a driveway plate or, particularly on residential jobs, by a "radio" control scheme. A reversing type 1/6-hp. motor is standard.

Two "Model Q" electric gate operators applied to a two-leaf swinging gate; with motors in 110 or 220 volts, 60, 50 or 25 cycles, single-phase a.c., 110 or 220 volt d.c. "Model QR," relay-equipped, also offered with 440-volt and three-phase motors. **Barber-Colman Co.**, Rockford, Ill.

•

Fluorescent Auxiliary

New fluorescent auxiliaries are compact and small for easy and concealed installation in strips, channels and lamp fixtures. Coils inside metal case are machine-wound and treated to remove and prevent absorption of moisture. Entire unit is sealed in all-weather resisting compound.



Fluorescent lamp auxiliaries; for various lamp capacities. **Jefferson Electric Co.**, Bellwood, Ill.

•

Industrial Truck-Tractor

Heavy-section formed plates welded into one-piece construction, including the control dash and pedal guard, make up the frame of this small industrial truck-tractor. Detachable end-gate may be adjusted to carry additional load and truck may be used to pull trailers. Drive unit employs free-coasting worm and gear and is equipped with a 500 per cent overload motor.

Type "IE" truck; rated capacity, 3,000 lb.; four speeds forward and four reverse; wheel base of 37 in., over-all length, 84 in. **The Elwell-Parker Electric Co.**, Cleveland, Ohio.

•

Air Circulators

"Aerolator"; 20-in. size in high and low stand, wall and ceiling models; three speeds, 1,650, 1,350 and 950 r.p.m. **Reynolds Electric Co.**, Chicago, Ill.

Motor pivot and tilting arrangement on these new air circulators permit the two-bladed fan to point directly at the ceiling In this way the air is forced along the ceiling outward to the walls and then down the walls to the floor, avoiding drafts. Three-speed motor control is provided.

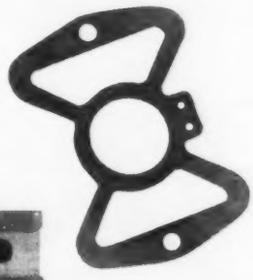
•

Conductivity Bridge

Measurements of resistance and electrolytic conductivity with this instrument are made by means of an a.c. bridge with an input voltage of three volts obtained through a step-down transformer. Bridge output voltage is connected to a single-stage vacuum tube amplifier, in turn coupled to a cathode-ray null indicator, which replaces the more conventional galvonometer. Voltage for amplifier and null indicator is provided by built-in d.c. power supply. Measurement of resistances from 0.2 to 250,000 ohms can be obtained with only two adjustments—main control and multiplier switch.

Model "R.C." conductivity bridge; operates from 110- or 220-volt a.c. line; accuracy plus or minus 1 per cent except for extreme ends of calibration. **Industrial Instruments, Inc.**, Bayonne, N. J.

WHEN DESIGNING A NEW PRODUCT



We fabricate parts to your specifications.

Dilecto is readily punched, sawed, drilled, machined, stamped, milled, etc.

Parts to your specifications can be furnished from either our Newark, Del., or Valparaiso, Ind. plants.

HAVE YOUR INSULATION CORRECTLY DESIGNED AND ACCURATELY BUILT TO MEET YOUR SPECIFIC PROBLEM

USE DILECTO

DILECTO for your particular use can be accurately built, not only in physical dimensions, but in basic properties.

The properties of this laminated plastic are predetermined by laboratory research and control. Individual properties can therefore be varied to meet specific problems and unusual design requirements.

Let our laboratory go into your insulating problem and submit samples of specially developed grades suited solely to your requirements. We also may be able to help you in speeding up production, cutting costs, improving performance—or all three. Write us today without thought of obligation.

CONTINENTAL DIAMOND FIBRE COMPANY

NEWARK, DELAWARE

***Represented in Canada* by DIAMOND STATE FIBRE CO. OF CANADA, LTD., TORONTO**

NEWS ABOUT PEOPLE

Allis-Chalmers Appoints W. Geist Vice-President

At a directors' meeting held recently in New York, Walter Geist was appointed vice-president of the Allis-Chalmers Manufacturing Co. Entering

the employ of the company in 1909, Mr. Geist progressed through various positions and departments from which he derived a broad knowledge of the various products of the company.

In the flour mill department he became interested in matters pertaining to design, with particular reference to transmission, and as a result he originated the idea of the multiple V-belt drive principle of power transmission, known as the Texrope drive. He first developed this from the engineering point of view and later as a sales engineer; and was made assistant manager of the milling department in 1928.

This vitally important development has revolutionized power transmission practices. Originally conceived for the textile industry, it was found to have such broad application that it has been adopted in practically every industry.

In 1933 Mr. Geist was appointed general representative, in which capacity he supervises the personnel of all district offices of the company, both domestic and foreign.

▶ CHESTER L. MCCLINTOCK, for the past ten years a member of the sales department of the Boston Edison Company and recently in charge of the pending orders division, has been transferred to the commercial cooking sales division, succeeding C. D. Davis, who resigned recently to become associated with the staff of the E. L. Weiskopf Company, Boston.

▶ CAMILLE F. POIRIER, assistant district manager of the Crocker-Wheeler Electric Manufacturing Co.'s Boston office, has been transferred to Ampere, N. J., as assistant to the general sales manager.

•

W. Jacobs New President of Belden Manufacturing

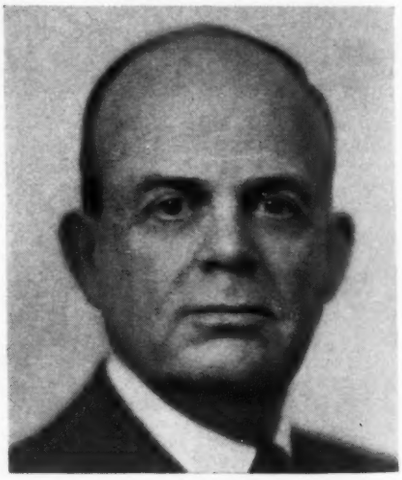
Whipple Jacobs, who was recently elected president of the Belden Manufacturing Co., Chicago, has served with the company for 24 years. Before assuming the duties of chief executive he was vice-president in charge of sales.

Mr. Jacobs is at present chairman of

the wire and cable division of the National Electrical Manufacturers Association. He is also a member of the Electric Club of Chicago and of the Electrical Manufacturers' Club.

J. R. Read Made President of Canadian Westinghouse

At a meeting of the board of directors of the Canadian Westinghouse Co., Ltd., held recently, John R. Read was elected president. Mr. Read's promo-



tion has been rapid. He was elected vice-president in 1936, prior to which he was connected with the Vancouver district office of the company, first as sales engineer and subsequently as district manager. He was elected a director of the company in 1938. Before going to Canada Mr. Read was connected with the Westinghouse Electric & Manufacturing Co. in this country and for a short time with the Northern California Power Co.

Paul J. Myler, the retiring president, continues as chairman of the board. N. S. Braden, vice-president, was elected vice-chairman. John S. Martin, who has been associated with the accounting department of the company for many years, has been elected to the new office of comptroller.

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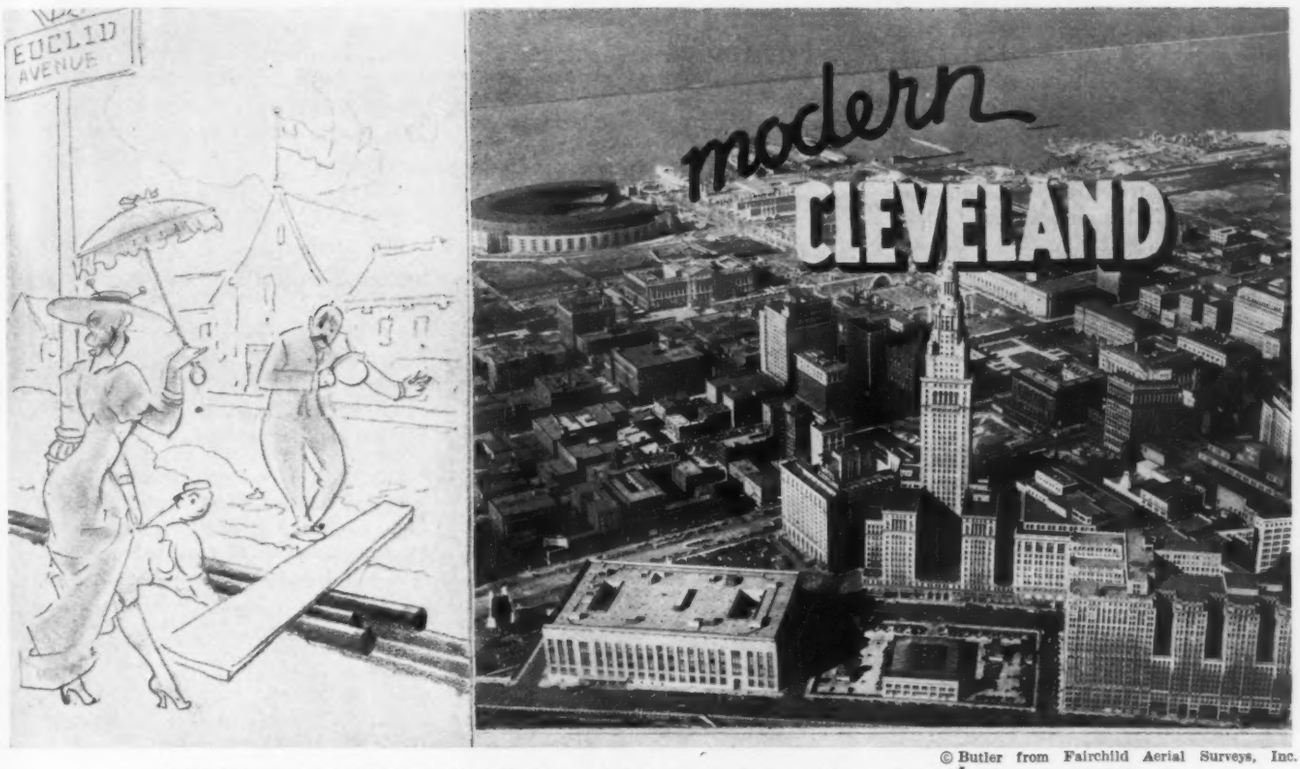
▶A. W. SCARRATT has been appointed vice-president in charge of engineering and patents of the International Harvester Co., Chicago, to succeed EDWARD

ORANGEBURG HAS *long* BEEN PART OF



© Butler from Fairchild Aerial Surveys, Inc.

In the foreground, the Union Terminal Development, is but part of the rapid growth of this Great Lakes Seaport, requiring the most modern and efficient underground distribution to meet ever increasing requirements.

INSTALLATION SAVINGS

Orangeburg Fibre Conduit is easy to handle. Light in weight, yet amply strong to resist breakage, it can be transported to the job in large truck loads, quickly unloaded and placed, one man carrying several lengths at a time. It assembles perfectly, with less time-consuming difficulty.
One of the many Orangeburg "points that count."

Orangeburg, trademark, is a guarantee of the best of Fibre Conduits, a time-tested enduring "service" of cable protection *wherever electrical raceway facilities are to be installed underground.*

● In 1893 . . . five years before the blowing up of the Battleship Maine . . . The Fibre Conduit Company started to build Orangeburg Fibre Conduit for *permanent* cable protection.

Extremely strong mechanically, yet Orangeburg Fibre Conduit prevents abrading, tearing or otherwise damaging even the softest cable covering. The ultimate economy of Orangeburg is reflected by installations that have already given more than 40 years of trouble-free service. Orangeburg's consistent program of research and product improvement is your assurance of maximum return from your investment in cable protection.

For installation underground with CONCRETE ENCASEMENT: ORANGEBURG *STANDARD* FIBRE conduit is recommended for duct banks (4 ducts and over), main distribution, high tension and "downtown" locations.

For installation WITHOUT CONCRETE ENCASEMENT: the Orangeburg dual-economy NOCRETE conduit is recommended for service entrances, extensions, parkways and street lighting, suburban distribution, laterals, signal systems, etc.

Sales Agent—Distributors

GRAYBAR ELECTRIC COMPANY INC. **GENERAL ELECTRIC SUPPLY CORP.**

MADE AT ORANGEBURG, NEW YORK
BY THE FIBRE CONDUIT COMPANY
292 MADISON AVE., NEW YORK CITY

ORANGEBURG ***Standard*** **for installation *with* concrete encasement**
NOCRETE for installation *without* concrete encasement

A. JOHNSTON, who has retired. Mr. Scarratt has been assistant to Mr. Johnston since 1936. One of the nation's best-known agricultural and automotive engineers, Mr. Johnston spent 45 years with the Harvester Company or its predecessors. Mr. Scarratt has had wide experience in the fields of automotive and agricultural engineering.

▶ WILLIAM F. O'BRIEN, assistant treasurer of Consolidated Edison Co., has been elected treasurer, succeeding the late John R. Fenniman. Mr. O'Brien was identified with Standard Gas Light Co. as assistant cashier, purchasing agent, assistant treasurer, treasurer and vice-president. When Standard Gas Light Co. was merged into Consolidated Gas Co. he became an assistant treasurer of the parent company, now Consolidated Edison Co. of New York. In 1937 he was named assistant treasurer in charge.

▶ WILLARD H. COBB, for the past several years general factory manager, mechanical goods plants, United States Rubber Co., has been appointed general manager of the mechanical goods and general products divisions. This position includes supervision of the manufacture of Lastex yarn and rubber thread. Herbert E. Smith, vice-president, will continue supervision of all the activities of the divisions. Mr. Cobb has been associated with the company since 1914.

▶ WALTER C. HESTON, formerly with the lighting sales staff of Pacific Gas & Electric Co. and one-time Pacific Coast editor for ELECTRICAL WORLD, has been appointed industrial engineer for the newly organized northern California division of the Pacific Coast Electrical Bureau in San Francisco. Clark Baker retains his position as lighting counselor, and Walter W. Ernest, formerly associated with San Francisco distributors' organizations, has been appointed secretary.

▶ R. B. BRAGG, for the past 15 years district manager of Pacific Power & Light Co., at Walla Walla, Wash., has been named district manager at Yakima to succeed the late L. R. Sheeley. Mr. Bragg is succeeded in the Walla Walla district by W. H. Till, formerly manager of the new industries department. Mr. Bragg joined Pacific Power & Light in 1913 in the Hood River district. For several years he served in several district offices and was district manager in Dayton and Pasco prior to going to Walla Walla in 1924. Mr. Till has been with the company since 1919 and was district manager in the Pendleton, Ore., district until last summer when he was made manager of the new industries department. The new industries department will continue under the direction of D. B. Leonard, commercial manager.

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Banks and Dibble Assigned to Bonneville by Ickes

Frank A. Banks, construction engineer of the Grand Coulee Dam project, has been appointed by Secretary of the Interior Harold L. Ickes as acting administrator of the Bonneville project, to succeed the late James D. Ross. Secretary Ickes also announced the appointment of Harry Dibble, electrical engineer, as assistant administrator to work with Mr. Banks and to represent him at the Portland project office.

Mr. Banks has been employed continuously by the Bureau of Reclamation since 1906. In 1933, when the Grand Coulee project was begun, he was assigned to the job as construction engineer and he has supervised the work since that time. While acting administrator of the Bonneville project, Mr. Banks will continue as construction engineer of Grand Coulee Dam.

F. A. Banks

Mr. Dibble was an electrical engineer on the staff of the Bureau of Reclamation from 1909 to 1924, and at the time he resigned from the bureau was chief electrical engineer in the Denver, Colo., office. After leaving the service of the bureau Mr. Dibble was retained by it until 1924 and by the Indian Service since that time as consulting electrical engineer.

Following the appointments, Charles E. Carey, principal construction engineer of the project, said "Secretary of the Interior Ickes has made an excellent choice . . ." to carry forward the federal power program in the Northwest. Both are top-rank engineers—men whose names are bywords in professional circles . . ."

•

▶ GEORGE I. MOMERY, district manager of West Coast Power Co.'s Burns, Ore., office, has been transferred to Fort Bragg, Calif., where he holds a similar position. H. GRAY, district manager at Fort Bragg, takes over the Burns office.

OBITUARY

▶ EDWARD T. HUGHES, manager of the Kansas Electric Power Co., at Parsons, Kan., died May 7 in his fiftieth year, after a long illness. Manager of the power company at Parsons for the past eleven years, Mr. Hughes was formerly in charge of the Northwestern Public Service Co. at Yankton, S. D.

▶ BERT R. SHUTT, superintendent of distribution for the Puget Sound Power & Light Co., died in Seattle recently. Mr. Shutt, who was 58 years of age, had been employed by the power company for 34 years.

▶ RICHARD M. VAUGHAN, formerly valuation engineer of the Washington Water Power Co., Spokane, and an engineer for the old Seattle Electric Co., died in Seattle on May 4. Mr. Vaughan was with the Spokane company from 1934 until illness caused his retirement last November, when he moved to Seattle.

▶ JOHN T. MOUNTAIN, retired assistant to the general service manager, Commonwealth Edison Co., died April 16, at the age of sixty, after a prolonged illness. Entering the company in 1899 in the interior wiring department, Mr. Mountain later served in the statistical and substation departments. He became a member of the load dispatcher's office when it was formed in 1904 and was appointed chief load dispatcher two years later. Mr. Mountain became assistant to the chief operating engineer in 1910 and he was assistant to the general service manager when he retired in 1935.

▶ JOHN J. GIBSON, who retired in 1935 from the office of director of the general service department of the National Electrical Manufacturers Association, died at his home in Philadelphia May 6, after an illness of several weeks. He was 66 years of age. Prior to joining the NEMA staff in 1933 he had been associated for more than 32 years with the Westinghouse interests. At the time of his resignation in 1932 he was occupying the position of vice-president of the Westinghouse Electric Supply Co. Mr. Gibson was a member of the American Institute of Electrical Engineers and of the Franklin Institute.

MANUFACTURING - MARKETS

Electrical Orders 28% Above 1938

Orders booked for electrical goods during the first quarter of 1939 were materially in excess of those for the corresponding quarter a year ago, according to totals reported to the Bureau of the Census by 78 companies manufacturing motors, domestic appliances, industrial equipment and other electrical apparatus and supplies.

The aggregate for the quarter was $197,654,216. Comparable amounts during the two preceding years were as follows:

Quarter	1937	1938
First	$271,064,295	$154,153,559
Second	260,835,867	157,315,411
Third	215,963,847	158,958,951
Fourth	182,306,350	160,374,036
Year	$930,170,359	$630,801,957

The figures are presented, not as a complete statement of the industry, but as sufficiently representative to indicate the trend, the bureau states.

•

Supply Contracts Awarded

Federal agencies have recently awarded contracts to electrical manufacturing companies for the following material:

General Electric, Navy, cable, communication, $11,664; dynamometers, electric, $50,980.

Condenser Service and Engineering Co., Inc., Hoboken, Navy, condenser and accessories, $21,600.

American Transformer Co., War, Ordnance, transformers, $10,120.

Westinghouse Electric Elevator Co., Navy, elevator repairs, $11,900.

•

Forms Export Department

Establishment of an export department for Bendix Home Appliances, Inc., of South Bend, Ind., has been announced. The new export division, headed by R. A. Lundquist, formerly of the electrical division of the Bureau of Foreign and Domestic Commerce of the Department of Commerce, was organized in response to a huge volume of inquiries relative to distributor and dealer franchising in Europe, South Africa and the Latin American countries.

•

Completes New Factory

South Bend Current Controller Co. recently announced completion of a new factory at 1237 North Side Boulevard, South Bend, Ind. The new building will afford improved manufacturing facilities with approximately 50 per cent more factory space and provide about triple the previous space for engineering and test.

•

Ratify Knapp-Monarch Plan

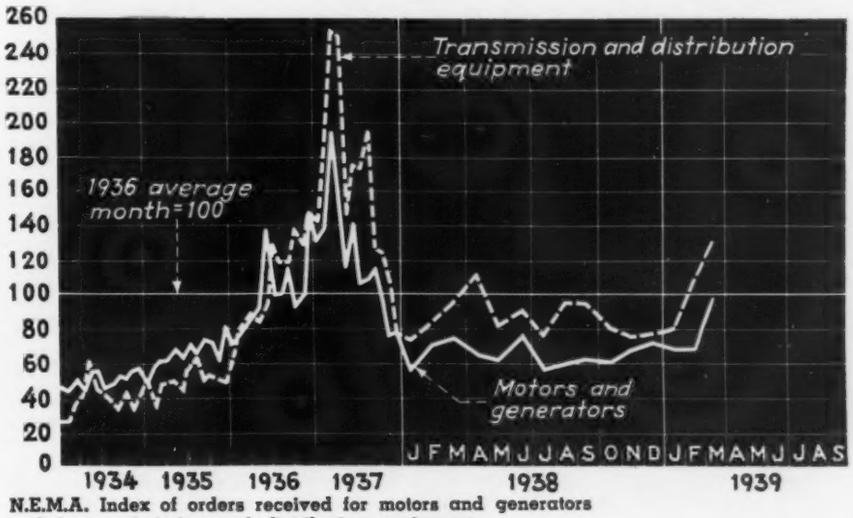
Preferred stockholders of Knapp-Monarch Co. have ratified the plan of the board for a $200,000 ten-year bank loan, proceeds of which will be used to retire about $49,000 remaining of the mortgage on the old Belleville plant and $24,000 of equipment notes, with the remainder going for additional working capital.

NEMA Index Shows Orders Increasing

Pronounced gains in orders for electrical equipment in March are indicated by the NEMA index numbers, which for motors and generators rose 31.5 points over February to 99.3 and for transmission and distribution equipment 20.8 points to 129.1. The former represents a rise of 46.5 per cent over the preceding month, the latter a rise of 19.2 per cent.

In the first group, which includes engine and belt driven generators, synchronous motors and other motors to 200 hp., the advance was stronger than in any other year of record; beginning with 1934, March exceeded February successively by 18.1, 2.7, 8.4, 41.4, 5.5 and 46.5 per cent. Corresponding percentage gains in orders for transmission and distribution equipment in March over February were 44.5, 35.6, 5.2, 39.6, 15.3 and 19.2.

Month	Motors and Generators 1938	Motors and Generators 1937	Transmission and Distribution 1938	Transmission and Distribution 1937
November	67.6	73.0	73.1	100.8
December	72.1	76.9	79.4	71.5
	1939	1938	1939	1938
January	69.2	57.4	81.0	70.2
February	67.8	70.8	108.3	79.3
March	99.3	74.7	129.1	91.4



N.E.M.A. Index of orders received for motors and generators and for transmission and distribution equipment

Oliver Steel Executives Retire; New Officers

Announcement has been made by the Oliver Iron & Steel Corp., Pittsburgh, of the retirement from active service of Harry F. Devens, chairman of the board, and John Jenkins, vice-president and secretary. Mr. Jenkins has been associated with the company for more than 52 years, and he retains his directorship.

New officers elected are as follows: Theodore F. Smith, president; H. O. Rea and J. C. Rea, vice-presidents; L. E. Uhrich, secretary and controller; W. F. Roll, treasurer; J. P. Roche, assistant secretary; J. H. Lammert, assistant treasurer.

•

Manufacturers Name New Sales Representatives

Electrical manufacturing companies have recently made the following appointments to their sales staffs:

Ward Leonard Electric Co., Mount Vernon, N. Y., has named C. B. Rogers, Atlanta, Ga., as representative for the sale of Ward Leonard electric control devices. Mr. Rogers' territory will be the states of Georgia, South Carolina and North Carolina.

Proctor Electric Co., Philadelphia, announces that Kirby R. Houghton, Eggertsville, N. Y., has been added to its list of representatives. Mr. Houghton will represent Proctor in upstate New York.

Graybar Electric Co. has announced the appointment of H. G. Cook as manager of its Grand Rapids, Mich., house. Mr. Cook has nineteen years of unbroken service at Grand Rapids. A. L. Perry has been appointed manager of the Erie district.

Chicago Pulley & Shafting Co., Chicago, has been appointed distributor of Ajax Flexible Couplings.

Roskin Distributors, Inc., has been appointed to merchandise Leonard electric refrigerators in the Boston area. The company will represent Leonard in metropolitan Boston, eastern Massachusetts and in southern New Hampshire.

•

Switchboard Bids Called

Sealed bids will be received by the secretary of the Loup River Public Power District for furnishing the duplex-control switchboards for the substation at Omaha, Neb., until June 8 in the offices of the district at Columbus, Neb.

New York Metal Prices

	May 16, 1939 Cents per Pound	May 10, 1939 Cents per Pound
Copper electrolytic	10.00*	10.00*
Lead Am. S. & R. price	4.75	4.75
Antimony	11.75	11.50
Nickel ingot	35.00	35.00
Zinc spots	4.89	4.89
Tin Straits	48.75	49.125
Aluminum, 99 per cent.	20.00	20.00

* Delivered Connecticut Valley.

Field Reports on Business

The move by the Administration to renew its attack on the utilities has resulted in further uneasiness. The strength of the domestic economic strength is shown by the fact that business is forging ahead in the face of lack of co-operation from Washington.

NEW YORK

The move by the Washington Administration to renew its attack on the electric utilities and to use the industry as the 1940 political "whipping boy" has caused some uneasiness as to what effect the procedure will have on general business. The "appeasement" program is definitely off, as indicated by recent events in Washington.

In the face of the political developments the utility industry is going ahead with its expansion plans in a fashion which should materially aid in expanding business activity. Utility earnings for the first quarter are encouraging with prospects that the first six months will be well ahead of the 1938 period. An upturn in general business is being predicted for the third quarter, with the probability that conditions in the last three months of 1939 will be good.

The fact that Congress is leaning heavily toward aiding business and that an influential group wants a show-down on utility policy is held to be encouraging for business in the future. Activity continues to reflect a fairly steady volume of retail trade, with some products moving faster than others. The settlement of the coal strike is expected to give driving force to trade here.

CHICAGO

Uneven tendencies in general conditions last week continued to cloud the outlook for the immediate future. Retail trade presented the most encouragement in the business picture as activity advanced 14 per cent over last year's level at this time. Industrial activity displayed a weakening tendency, although maintaining a pace substantially above a year ago. Manufacturing of heavy equipment declined slightly and electrical energy output fell off to 9 per cent above the output a year ago.

A majority of the electrical manufacturers report a considerable increase in business over last year. The demand for appliances is steady and sales continue to expand. Orders for industrial equipment have leveled off somewhat as many large plants are reluctant to make commitments. Air-conditioning installations show a gain over last month and interest in fluorescent lighting continues to mount.

Utility buying is fairly steady as several new construction projects are getting under way. Commonwealth Edison Co. has budgeted $75,000,000 for plant expenditures for the next three years in comparison with $48,000,000 for the current year.

Residential construction continues to expand moderately and electrical contractors report considerable rewiring business from the Electric Home and Farm Authority time-payment campaign.

NEW ENGLAND

Small motor buying and a steady demand for switch and control apparatus continue to advance under the stimulus of heavy government orders now being filled in this area. One manufacturer reports regular calls from local manufacturers of precision machines for ½-hp. motors; since the first of the year one representative has sold more than forty 5- and 7½-hp. motors which are to be used for individual drives on large lathes and boring machines. Recently an order for more than $30,000 in lathes, each motor equipped, was received by a prominent New England machine builder.

The MacInnes Store, Worcester, is adding 10 kw. in tungsten and fluorescent lamps to its rug department.

Studies for power plant expansion requirements are being carried on for several industrial plants in this district. New air-conditioning installations are being considered on an encouraging scale for small downtown restaurants, according to one engineer who has recently estimated about $35,000 worth of projected work. Contract involving air conditioning for a large Boston hospital is being drawn up.

Central Maine Power Co. reports construction of 258 miles of rural lines in 1938, costing $326,000 and serving more than 1,100 new customers. New illuminated signs are of interest; one large department store has mounted a combination Neon and lamp sign which will utilize approximately 15 kw.

Merchandising in eastern Massachusetts has slowed up this month on account of the unusually cold weather. In Vermont sales of refrigerators are holding up well, with 83 units bought for the first week of May and 96 for the week previous. Contractors note a marked falling off in new construction projects.

PACIFIC COAST

Pacific Coast building permits for April were 17 per cent over April, 1938, in value and just abreast of April, 1937. The Parker Dam transmission line project is now about ready for bidding, with 140- and 120-mile lines to Phoenix and Blaisdell, Ariz., respectively, requiring 300,000-circ.mil. copper wire for 161,000-volt transmission. Burbank, Calif., has bought $9,500 worth of weatherproof copper, mostly No. 4/0. Northern California FHA loans to date show a 55 per cent increase over the corresponding period of last year. Los Angeles and San Francisco report much downtown remodeling of major retail and office structures, with considerable electrical work making up a large proportion of the cost, typical orders being the relighting of eight floors of the Standard Oil Building in San Francisco. A new 24-story San Francisco apartment house is being equipped throughout with electric ranges.

The Northwest reports good Alaska business, where considerable building is in progress, such as a hospital in Kanakanak, a five-story office building in Juneau, and the $825,000 post office and courthouse at Anchorage.

The outstanding order covers $1,454,700 to Westinghouse for furnishing and installing two 82,500-kva. generators at Boulder Dam plant. Line material sales are particularly good, including $75,000 for poles for Bonneville distribution lines, $30,000 for poles and crossarms for Imperial Valley and $32,100 for strain connector parts, $22,544 for transformers and $32,316 for insulators, all for Los Angeles.

Recent Rate Changes

PACIFIC GAS & ELECTRIC CO. will reduce its electric rates $2,200,000 annually and gas rates $1,000,000 annually, according to an announcement made by the California Railroad Commission. The new rates will become effective July 1 for electricity and August 1 for gas. The reductions were said to be the result of an investigation of rates by the commission and informal negotiations with the company. The spread of the reductions was not announced, but the commission said one investigation was into the equity of rates charged consumers in heavy-load rural areas. The reductions will apply on a system-wide basis, it was said.

GEORGIA POWER CO.'s new rate schedule estimated to save $73,000 annually to its residential, commercial, refrigerating and heating customers has been approved by the state Public Service Commission. The new schedule is on inducement rates. Commission Chairman Walter McDonald said the residential inducement rate approved, "substantially lower than its present inducement rate", would become the general residential rate applied to all customers after a three-year period. McDonald said when this rate became general, it would mean a saving of $1,000,000 annually to the company's customers, based on an analysis of the company's present customer consumption. The estimated $73,000 immediate savings were broken down into $17,000 residential rate savings; $31,000 for commercial, and $25,000 for industrial savings.

WISCONSIN PUBLIC SERVICE COMMISSION has authorized rate reductions for the Kaukauna and Waupun municipal electric utilities and the Wisconsin Power & Light Co. Rate reduction by the first utility will result in annual savings of $6,200 to home users of electricity, $3,800 for business customers and $900 for farm users. Waupun's rate reductions amount to more than $8,700 of which total annual savings home users will benefit by $3,600; business users, $2,550; power users, $600 and the city more than $1,900 on street lighting. Five thousand business lighting customers will save $47,000 and 1,600 business power customers will save $27,000 annually as a result of cuts volunteered by the Wisconsin Power & Light Co.

EDISON LIGHT & POWER CO., York, Pa., has adopted Public Utility Commission rates, saving customers $435,000 a year, after a two-year battle which ended in the U. S. Supreme Court.

MOUNTAIN STATES POWER CO. has filed notice of new residential and commercial tariffs in its Coos Bay division. The new residential rates, which will go into effect with May meter readings, will mean a saving of $23,000 annually to householders, and the commercial rates, to go into effect with June meter readings, will mean a saving to customers of $9,000 annually.

ORANGE & ROCKLAND ELECTRIC CO. has filed a general electric rate reduction with the New York Public Service Commission which is estimated to save customers of the company a total of approximately $8,120 annually. The commission permitted the lower rates to become effective as of May 1.

ABINGTON ELECTRIC CO., Clarks Summit, Pa., has been directed by the state Public Utility Commission to file a new tariff designed by the commission to save customers approximately $30,000 a year, effective for all billings after May 15. The order simplifies the company's tariff. All

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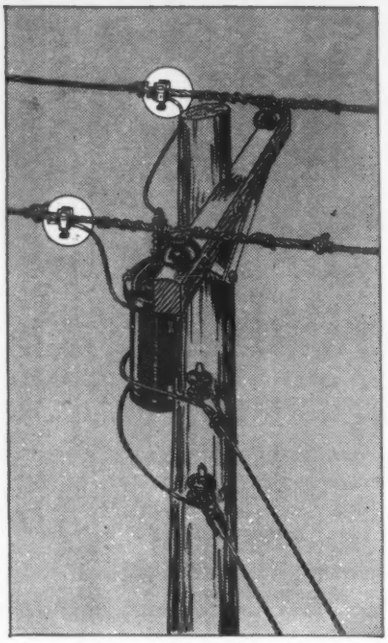

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domestic and residential service will be provided in one schedule and four schedules will be eliminated. The rates of 2,806 domestic customers are reduced as follows: 229 customers on rural line extensions obtain a total annual reduction of $1,505; 2,577 other domestic customers receive a total annual reduction of about $20,900. The monthly minimum billing is reduced from $1 to 75 cents. Most of the 321 customers now receiving service under the commercial schedule are relatively small users and the new rates will save them $6,515 annually.

ILLINOIS COMMERCE COMMISSION has announced that electric rate revisions effective during the month of April, resulted in an estimated aggregate reduction of $1,420,937 in annual operating revenues. Effective April 1, the commission directed the four major companies operating in the Chicago area to reduce their rates to small power and light (commercial) customers.

BROCTON, N. Y., municipal lighting plant has filed a reduction of electric rates with the Public Service Commission which is estimated to save the consumers about $4,616 annually. The commission permitted the lower rates to become effective immediately.

•

City Lets Plant Contracts

Contracts for the construction of a municipal light and power plant, equipment and distribution system at Anita, Iowa, have been awarded by the city as follows: Building to the Jensen Construction Co., Des Moines, Iowa, at $18,680; engines to Worthington Pump & Machinery Co., Kansas City, Mo., at $44,355; switchboard to Electric Motors Co., Cedar Rapids, Iowa, at $5,400 and electric distribution system to G. W. Jones Electric Co., Kansas City, Kans., at $25,578.

•

Truck Shipments Increase

Domestic shipments of electric industrial trucks and tractors during March, as reported by nine manufacturers, representing the entire industry, totaled 86, as against 53 in February and 74 in March a year ago, according to the Department of Commerce. For the second consecutive month no export shipments were made. Domestic shipments for the first quarter were 186, as against 242 in the first quarter of last year.

•

Dangers of Kite Flying

Wisconsin Public Service Corp. is using Charlie McCarthy and his pal Mortimer Snead in the campaign against kite flying accidents. Each year the company publicizes the danger of flying kites near electric wires through paid newspaper advertising and posters. The use of the McCarthy and Snead characters was through the courtesy of Edgar Bergen, radio and movie actor.

Municipal Plants

MONTROSE, COLO.—Proposed city charter amendment to permit construction of a municipal power plant was defeated at a recent special election, 1,230 to 909.

HUNTINGTON, IND.—After years of strife, the municipal electric plant appears finally dead. The Indiana Service Corp. at Fort Wayne, Ind., has purchased the used electric meters and transformers from the receiver. The equipment will be moved to Fort Wayne for use by the purchasing company.

BOONVILLE, IND.—Southern Indiana Gas & Electric Co. has lost its appeal to the Indiana State Supreme Court involving condemnation proceedings by the city against the utility's property in that city This was an appeal from an interlocutory order against naming appraisers to appraise certain property of the appellant on which the holding company held a mortgage. The company contended there was not proper preliminary procedure. There was a petition to the City Council, signed by more than five per cent of the voters, requesting purchase of the property, the company contended, and not the present condemnation proceedings. The company contended that the law providing for condemnation of utility property is in violation of the Federal Fourteenth Amendment and impairs obligations of contract in violation of the Constitution. The court declared the 1933 act providing for such purchase and condemnation is not coercive or taking property without due process of law.

RISING SUN, IND.—Citizens have voted to purchase the light and water plants from the Associated Gas & Electric Co. for $155,000. The purchases are to be financed by a bond issue.

WOODBINE, IOWA—Citizens have approved by a vote of 563 to 138 the building of a municipal electric plant to cost not more than $115,000. The town is at present served by the Iowa-Nebraska Light & Power Co.

CHARLESTON, MISS.—Voters have approved a bond issue of $75,000 for construction of an electric distribution system and a white way. The vote was 251 to 46. The new power system will distribute TVA power. Mississippi Power & Light Co. has a plant at Charleston.

YORK, NEB.—Iowa-Nebraska Light & Power Co. won a victory over the city when Federal Judge Munger ruled that the utility has a permanent franchise in the city. The city brought suit asking an order of removal on the grounds that the original franchise was invalid, and even if it were valid, had expired in 1937. The court dismissed the petition. The opinion said that the franchise was granted to the original company "or its successor or assigns." Although the original company's life was only 50 years, this did not terminate the franchise, Judge Munger ruled. The franchise, with no time limitation, cannot be limited to the life of the original grantee. Not until 1911 did the Legislature set a 25-year limit on electric light franchises. There remains in federal court a suit by the utility against the city, challenging the validity of an election in 1937, by which the city voted $475,000 in bonds for construction of a municipal electric light and power plant. The company was granted a temporary injunction. The suit was allowed to remain in this status until determination of the franchise matter.

Sales Opportunities

GREELYVILLE, S. C.—Carolina Power & Light Company, Raleigh, N. C., plans new 33,000-volt transmission line from Greelyville (Williamsburg County) to Pinopolis (Berkeley County), about 28 miles, for power supply for construction of West dam, lock and other structures for hydroelectric power development of South Carolina Public Service Authority, Columbia, S. C., at latter place, known as Santee-Cooper project. Contract has been made for service and work is scheduled to begin at early date.

MUSCATINE, IOWA—Board of Water and Light Trustees receives bids until May 31 for one 7,500-kw. turbo-generator unit and auxiliary equipment, and for surface condenser for such generator (Sections 3 and 4) for installation in municipal electric power plant, where expansion and improvements will be carried out to cost close to $500,000. Young & Stanley, Inc., Muscatine, is consulting engineer. Wilbur R. Thorson is general manager at station.

PAINESVILLE, OHIO—A. E. Staley Manufacturing Company, Decatur, Ill., manufacturer of starch, oils and kindred products, plans installation of motors and controls, conveyors, electric hoists, loaders and other equipment in new branch plant at Richmond Village, near Painesville, for soy bean processing for oil, meal, etc. Company has taken over property of Baltimore & Ohio Railroad at place noted, and will modernize and improve at once; new additions will be built. Cost about $300,000. A. E. Staley, Jr., is president.

CLEVELAND, OHIO—Cleveland Electric Illuminating Company has plans maturing for new indoor power substation at Payne Avenue and East 21st Street, reported to cost close to $110,000, with transformers, switchgear and auxiliary equipment. Proposed to begin work this spring.

GREENVILLE, N. C.—Water and Light Commission has plans for primary and secondary lines from city limits to points in Pitt County for rural electric service from municipal power station, including service facilities. A total of about 110 miles will be built. Initial financing in amount of $88,000 has been arranged through Federal aid. Proposed to begin work soon.

SYRACUSE, N. Y.—Crucible Steel Company of America, Inc., 405 Lexington Avenue, New York, N. Y., plans installation of motors and controls, conveyors, switchgear, electric hoists and other equipment in connection with expansion and improvements in branch mills at Syracuse, comprising Sanderson Brothers Steel Works, Magnolia Street, and Halcomb Steel Company, State Fair Boulevard, respectively. A new addition will be built at latter plant. Proposed to carry out program soon. Cost reported over $350,000.

MASSILLON, OHIO—City Council has authorized an appropriation for surveys and estimates of cost for a proposed municipal electric power plant for city lighting service.

GERING, NEB.—Bureau of Reclamation, Denver, Colo., receives bids until May 26 for following equipment for Gering power substation, North Platte project, Nebraska-Wyoming: One control switchboard, three 15-kva., 6,900-11,950 Y to 155-230-volt, single-phase, 60-cycle, outdoor distribution type transformers; seven 34,500 to 115-volt, outdoor, oil-immersed potential transformers; three 34,500-volt, outdoor, oil-immersed current transformers; three dry-

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type outdoor, 5,000-volt current transformers; 69 34,500-volt, 400-amp., single-pole, single throw hook-stick operated, outdoor type disconnecting switches; seven 34,500-volt, 600-amp., three-pole, outdoor type oil circuit breakers; and for two 34,500-volt, three-phase, station-type lightning arresters. All equipment will be installed by Government (Specifications 1230-D).

CUPERTINO, CALIF.—Henry J. Kaiser Company, Latham Square Building, Oakland, Calif., building and engineering contractor, plans installation of motors and controls, motor-generator set, transformers and accessories, regulators, conveyors, loaders and other equipment in proposed cement mill near Cupertino, Permanente Canyon district, to be used for material supply for construction of Shasta Dam of federal government, for which company is securing award, totaling about 5,800,000 barrels, low-heat Portland cement. A power house will be built. Entire project is estimated to cost approximately $3,500,000. Proposed to begin work soon.

OMAHA, NEB.—Nebraska Power Company, Omaha, plans extensions in transmission and distributing lines in parts of Cass and Douglas Counties for expansion in rural electric system. Application for permission has been made. Work will be carried out this spring.

BOISE, IDAHO—Idaho Power Company has plans for new one-story and basement service, maintenance and operating building on Twenty-fifth Street, about 140 x 155 feet, to include cable and wire, meter and other operating departments. Cost estimated over $100,000, with equipment. Erection will begin soon.

CHARLESTON, MISS.—Has approved a bond issue of $75,000 for municipal power substation for distribution service, extensions in distributing lines and installation of number of blocks of ornamental lamps in downtown district.

EDGEWATER, N. J.—Hills Brothers Coffee, Inc., 2 Harrison Street, San Francisco, Calif., plans installation of motors and controls, conveyors, regulators, transformers and accessories, loaders and other equipment in new branch plant at Edgewater, where site has been secured. It will consist of a large one and multi-story unit, estimated to cost close to $750,000. Austin Company, 16112 Euclid Avenue, Cleveland, Ohio, engineer and contractor, will design plant and supervise erection.

SAN ANTONIO, TEX.—Civil Aeronautics Authority, Washington, D. C., plans installation of a series of beacon lights and towers on San Antonio-Houston airway; also signal equipment, radio facilities, etc. Bids will be asked soon. Cost estimated close to $150,000.

•

British Output Up in March

Official returns made to the British Electricity Commission show that 2,508,000,000 units of electricity were generated by authorized undertakers in Great Britain during March, compared with the revised figure of 2,111,000,000 units in March, 1938, an increase of 18.8 per cent. During the first quarter of 1939 the total amount of electricity generated was 7,546,000,000 units, compared with the revised figure of 6,639,000,000 units for 1938, an increase of 13.7 per cent.

Copper Catalysis Accelerates Turbine Oil Oxidation

[*Continued from page 37*]

The results of these observations, showing the effect of metal catalysts, particularly brass, on turbine oil was called to the attention of several of the large oil refiners. The general opinion of the refiners is that many of the present oils can be inhibited against these catalysts. It is interesting to note that during the past year two additional turbine oils have been successfully inhibited. In this connection the writer wishes to acknowledge the fine co-operation which he has received from several of the research departments of the oil companies during this investigation.

Attention is called to the fact that not all the inhibited oils are satisfactory even though they pass the above described test. This is due to the fact that many of the inhibitors employed are water soluble. It is therefore necessary to give the oil a thorough water washing prior to making the above test.

The test described furnishes a means for the study of various metal catalysts and their effect on different oils. The test may require 1,000 hours for good oils. The writer has found, however, that the introduction of the brass condition (admiralty metal) into the Funk oil machine furnishes the complete story of performance because it takes into consideration the effect of water washing along with the other essential conditions. This modified Funk oil test will quickly pick out the undesirable oils. Oil which will remain unaffected for 200 to 300 hours in this modified test has been found to be very stable.

The second graph shows the actual performance with respect to neutralization and viscosity changes for three different oils. Oil "A," showing practically no change in neutralization number, is the oil which was first discovered to be unaffected by the metal catalysts. It is interesting to note that the service performances of oil "A" and oil "C" were obtained on the same turbine.

It is very evident that the turbine oil specifications of today should include a metal sensitivity requirement, since the present resistance to oxidation requirements generally found in turbine oil specifications are inadequate in the event that the oil is in constant contact with copper alloys.

Is Thrift No Longer Worth While?

[*Continued from page 50*]

the bill down to budget estimates. The idea apparently was to force the increased spending without compelling the spenders to take the responsibility for it by having their names recorded!

A day or two before this the Senate showed the same tendency, boosting the agricultural appropriation bill by about $338,000,000 to a grand total of $1,218,666,572. When it is realized that, what with the present government policies on wheat, cotton, and other farm products, it is perfectly obvious that these are *not* emergency appropriations, but on the contrary are more apt to be increased next year and the year after that than reduced, it is not difficult to understand why investors should be wishing they could buy gold in order to play safe.

And as this is written there is no assurance that the $200,000,000 (lowest estimate) for the Florida ship canal, which not even all the people in Florida want, will not pass!

What became of that business "appeasement" anyhow?

•

Appliance Sales Gain

Despite the fact that trade in allowances were discontinued January 1, range sales in Southern California Edison Co. territory so far this year have been running 9 per cent ahead of a year ago, according to H. C. Rice, domestic sales manager. A campaign on Westinghouse ranges ran into late April, one on Hotpoints is now getting under way. The company is urging dealers to offer a 5 per cent trade-in allowance for old equipment or a set of aluminum ware valued at $15.25. Water heater sales in the same region are somewhat behind a year ago.

•

Sioux City Utility Cited

FPC has announced its order directing the Sioux City Gas & Electric Co. to show cause, under oath, on or before June 5, why the rates and charges of the Sioux City company for electric energy furnished its wholly owned and controlled subsidiary, the South Dakota Public Service Co., should not be made available for electric energy sold by the Sioux City company to the incorporated city of South Sioux City, Neb.

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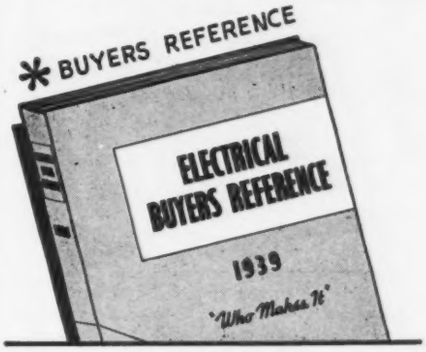

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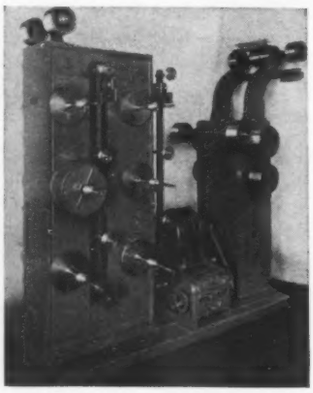

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Company Sorority Builds Good Will

[*Continued from page 47*]

trained in the business? Industry is beginning to realize the importance of women in its executive councils where policies are made. A major utility recently recognized this need by placing a qualified woman on its directorate.

To convey, especially to our women customers, something of the industry's appeal and human achievement, the general chairman prepared an illustrated, non-technical lecture, tracing the history of electricity—its history, production, distribution and application. This has been presented before hundreds of groups, always with appreciative reception. People want to know. They enjoy and trust business more when they understand.

Every business has a personality—by which it is known and recognized, and judged as a factor in the community. It takes thought and work and sacrifice to build a personality that will win and keep favorable consumer opinion and insure good public relations. Industry needs the co-operation of all its branches and all its personnel to build such a personality and to mold public opinion so that "people will give business freedom to serve them well."

The Edison Women's Committee is voluntarily doing its part. That it has won favorable consumer opinion is evidenced by the fact that each year the newspapers of our territory have given from 2,000 to more than 4,000 inches in their news columns. Front page space is not unusual. These papers serve a reading public of more than a million persons. Verbal and written appreciation is constantly expressed by consumers in every division. A further proof of consumer acceptance is the fact that in the last three years our girls have added to estimated annual revenue more than $160,000! In many of their "load-building campaigns" the girls serve as team captains for all employees, commercial and operating, with outstanding results in general employee interest as well as load.

Two groups have conducted community contests in outdoor Christmas tree lighting, offering generous prizes, and calling upon prominent citizens to serve as judges. Public re-

sponse and interest have been gratifying and substantial.

The constant aim of this sorority of Edison Women in all its activities has been to humanize the company, to bring it down to where people live, proving it not some far-off "power company," but a community institution of friends and neighbors.

Short Circuit Removes Conductor Glaze

[*Continued from page 41*]

off completely. In all, during the last three sleet storms, twenty melting operations of the types described were carried through and all of them were entirely successful.

It is evident from the above that the operations described and the work carried out involve magnitudes of power and kva. that cannot generally be economically and easily obtained except on a large interconnected and integrated system. The losses, too, involve the equivalent of the tying up of a generator of no mean size, and that implies a roominess with regard to reserve capacity that cannot usually be found except on a system of fairly large magnitude. However, once these conditions are satisfied the method described above offers a means of combating glaze with a facility and quickness that have never been equaled, let alone surpassed, by any other method previously described or utilized. Further, it does so with a minimum of additional expenditure in the way of special facilities such as transformers or similar devices. This is another way of saying that under conditions of glaze it has been found possible to gain another advantage from the interconnected system that cannot be obtained from isolated operation. And this work stresses again the great value of an interconnected and integrated system under emergency conditions.

It is obvious that a considerable amount of work in the way of improving terminal facilities such as disconnect switches, current transformers, clamps, etc., had to be carried through to make possible the handling of quantities of current of two and three times normal value with entire safety. This having been done and the method of combating glaze having proved so effective, work is now being carried out and stress is being laid on the problem of preventing ice formation. Whether this can ever be done by chemical or other means is something for the future. But, for the present, effort is being concentrated on the prevention of excessive glaze by getting to the line and applying melting measures before any appreciable formation has taken place. This is not a simple matter, since altogether too frequently ice formation will start at night when observation of any significance for many hours at a stretch is almost impossible, both because of absence of light and in many cases because of the impassability of roads and highways. Work has, therefore, been carried out to attempt to determine the condition of the line from its behavior as a conductor of high-frequency carrier waves. Experience with carrier communication and other forms of signaling have demonstrated that glaze formation on the line has an effect on high-frequency current attenuation and on the strength of the signal received to an extent that a carefully designed receiving circuit can detect. This work, which offers even greater promise in simplifying the ice melting problem, it is hoped to describe in an early forthcoming article.

While the work described is the result of a study founded upon a complete knowledge and understanding of the characteristics and behavior of transmission circuits and interconnected transmission system performance, all of the field work and the courage and faith needed to join in carrying through successfully these ideas and conceptions were supplied by the operating staffs of several of the companies of the American Gas & Electric Company Central System. Acknowledgment is due all of those who participated in it, and particularly to J. J. Gerard of the Indiana & Michigan Electric Company and T. J. Williams of the Ohio Power Company.

•

City Plant Lets Contract

The city of Macon, Mo., has awarded contracts for improvements at the municipal light and power plant, subject to final approval by the PWA, as follows: Turbo-generator to Westinghouse Electric & Manufacturing Co., $39,200; condenser to the Elliott Co., Pittsburgh, $13,410; boiler and brickwork to Union Iron Works, Erie, Pa., $20,777, and stoker to the Riley Stoker Corp., Worcester, Mass., $5,446.

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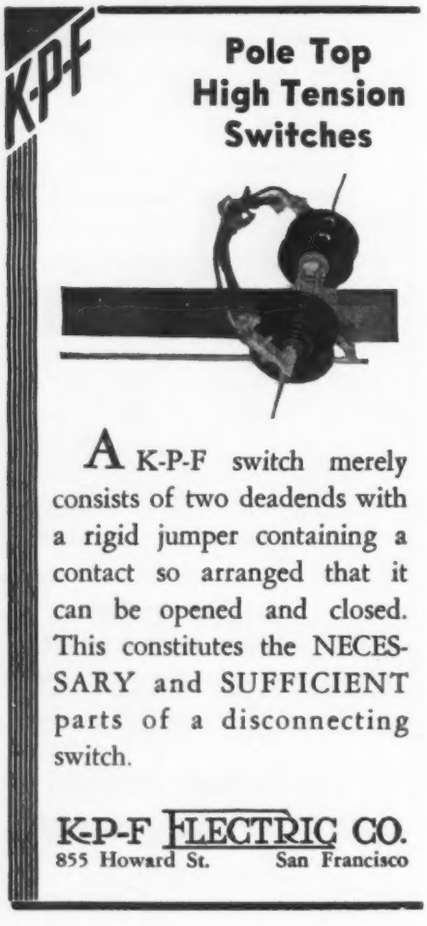
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K-P-F ELECTRIC CO.
855 Howard St. San Francisco

The Low-Down on Fluorescent Lighting

[*Continued from page 39*]

tions? Will the novelty of the lighting have attraction value? These are only a few of the various questions which must be answered before any installation of fluorescent lighting can be judged on the basis of cost.

General statements on costs invariably leave false impressions. Especially is this so in lighting, for so many factors besides dollars and cents enter to determine whether a buyer can afford to install "planned lighting"—planned to suit his particular needs, regardless of whether either fluorescent or incandescent lamps are under consideration.

With most fixtures for the use of the fluorescent lamp still in the development stage, their cost is relatively great. Since the greater portion of the present-day installations require specially designed equipment, the fluorescent lamp in many cases is being used at a higher cost than for similar lighting with incandescent lamps. While the ratio varies widely, yet in the case of general illumination (distinct and separate from special supplementary or decorative lighting) fluorescent lighting may be as much as twice that of incandescent lighting per foot-candle of illumination. In the case of cove lighting (Fig. 2) however, the cost is more likely to be the same or to the advantage of the fluorescent lamp. This is also true when "daylight" color is desired for any purpose.

Naturally, cost should be considered with due gravity in the designing of any lighting installation, but good lighting must be functional yet at the same time serve the demands of good appearance, novelty and decoration. Often, the great drawing power of novelty alone is sufficient to justify added lighting expense, especially in the selling and entertainment world. As fixtures become more standardized and other equipment less expensive, due to volume use of these lamps, the cost factor may be expected to change considerably.

Certified Fixtures

Recently several manufacturers of fluorescent lighting fixtures have joined together, along the lines of the manufacturers of certified I.E.S. lamps, and have commissioned the Electrical Testing Laboratories to test

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THE COLOR TELLS THE SIZE
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Central Stations everywhere recognize COLORTOPS as the standard for comparison because it alone offers such "Plus Values" as:
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When Buying Fuses—Compare Plus Values
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and aid them in the design of all fixtures using fluorescent lamps in accordance with specifications for such equipment prepared by the Mazda lamp manufacturers. Fixtures meeting these specifications will carry seals certifying that they have been designed properly, and a co-operative advertising campaign will be undertaken to acquaint the public with this seal of certification and the advantages of fluorescent lighting in general. All certified fixtures will be known as "Fluer-O-Liers," a coined name expressive of the lamp and its characteristics.

By this very action the public is assured of well-designed equipment, embodying the latest developments of the research laboratories engaged in experimental work in this field. Confidence in the lamp and its advantages are bound to grow as a result provided the illuminating engineer and the electrical industry as a whole take every precaution to foster and enlarge this public confidence by wise and careful application of the fluorescent lamp where its unique qualities can be used to best advantage.

New Safety Mount Holds Transformers on Poles

[*Continued from page 45*]

double arms with an eye-bolt and lagging to the bottom arm. The transformer clevis is bolted to the eye-bolt and the lower bracket, which just straddles the channel, is fastened to it by means of a through-bolt passing through holes in the straight part of the bracket legs and in the flanges of the channel.

In addition an adapter has been developed which may be applied to conventional type steel tank transformers, thus permitting them to be installed in the same manner and with the same safety features.

This method of mounting transformers has been accepted as standard by the New England Power Association and transformers are now being installed equipped with these hangers at the manufacturers' shops.

•

Leipzig Fair Sets Record

The spring session of the Leipzig Trade Fair, recently concluded, was the best attended in its history. A total of 331,256 buyers were attracted from 72 countries, an increase of 27,256 over last year. The fair comprised 9,894 exhibits.

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INDIANA STEEL & WIRE CO.
MUNCIE, ◆ INDIANA

Range and Water Heater Sales Stimulator

[*Continued from page 43*]

be published toward the end of the month. The cost of this ad was paid for by both utilities located here in Fort Wayne.

The electric meter which was used on the range for this demonstration was tested for accuracy by the meter departments of both electric utilities and was sealed before the demonstration by two well-known civic leaders in Fort Wayne. After the demonstration was completed the meter seal was broken and, as stated above, it registered only 6¾ kw.-hr. for the three-day period.

Some dealers tied in with the demonstration by conducting a guessing contest as to what the cost would be for cooking all the food for a three-day period. We are informed that the results of this feature of the contest produced some excellent prospects.

Finally, the results of the activity produced 161 electric range sales, and the dealers were also able to secure 57 electric water heater sales during Discovery Month.

In view of the fact that we did not announce the result of our demonstration until the latter part of the month, we felt that a great number of people would defer the purchase of an electric range until they could see the results of the demonstration. This prediction came true, as our sales the month after Discovery Month were about as great as those reported during the campaign.

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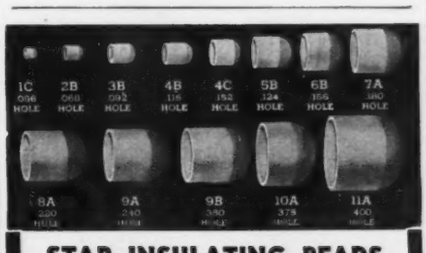
Moves Chicago Office

Crouse-Hinds Co. announces the removal of its Chicago office to 600 West Jackson Boulevard.



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STAR PORCELAIN CO.
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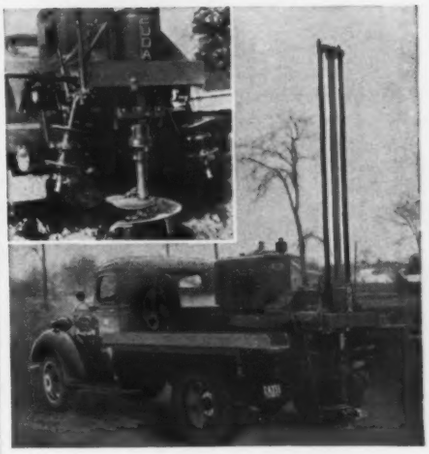

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- **Efficient—drills holes 24 inches in diameter, 6 feet deep in 3 minutes.**
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- **Mounted on standard truck, trailer or tractor.**
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June 3rd issue of
ELECTRICAL WORLD

close for press earlier than the usual closing time.

The cooperation of advertisers is solicited in forwarding new copy, or changes of copy, to reach us accordingly.

FINAL CLOSING TIME
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